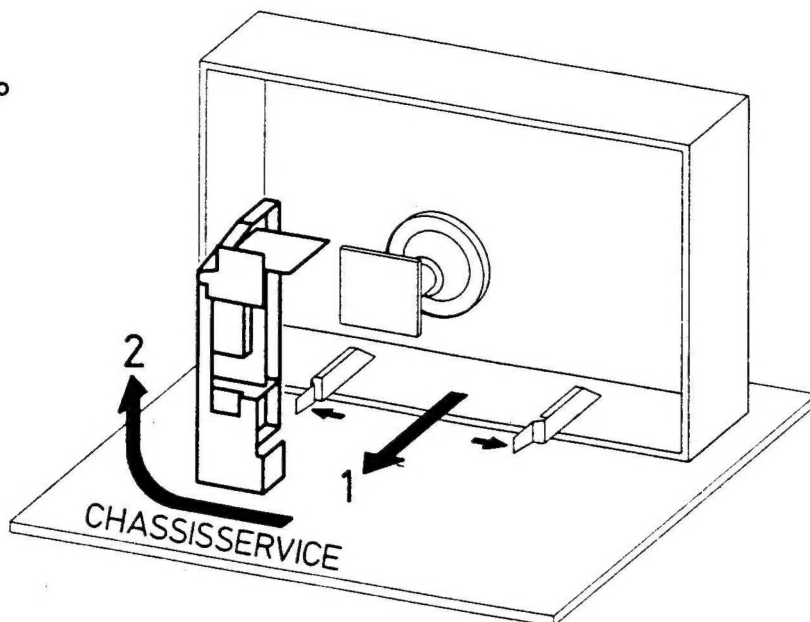


Servicestellung
Service position
Posizione di servizio



GRUNDIG



ⓓ Btx * 32700 #

SERVICE MANUAL CUC 3410

T 70-340 a CTI
T 70-340 a CTI/text

(9.25496-01)
(9.25496-02)

ⓓ SERVICEHINWEISE

Service am I²C-Bus und Fehlerarten des Gesamtgerätes:
Funktions- und Servicehinweise des Zeilennetzteils
Abnehmen und Aufsetzen der Geräterückwand
Abgleichhinweise der Steckkartenarten

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Ⓒⓑ SERVICE NOTES

Service checks on the I²C Bus and faults in the complete set:
Functional description and service information on the line mains supply unit
Disassembly and assembly of the cabinet rear panel
Alignment notes of the plug-in board types.

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Ⓛ AVVERTENZA DI SERVIZIO

Servizio assistenza al bus I²C e tipi di errori dell'intero apparecchio:
Istruzioni per il funzionamento e per il Servizio assistenza dell'alimentatore di riga
Smontaggio e montaggio dello schienale
Avvertenze di taratura dei tipi di scheda.

Pagina

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Notizen:

Lined area for notes.

Symbole und ihre Bedeutung
Symbols and their meaning
Simboli e loro significati

P	PROGR.	U_{V0}	SCHALTSP. VIDEO QUELLE SWITCHING VOLT. VIDEO SOURCE TENS. DI COMMUT. SORG. VIDEO TENS. DE COMMUT. SOURCE VIDEO TENS. COMMUT. VIDEO
P1	PROGR. TASTE PROGR. BUTTON TASTO PROGR. TOUCHE PROGR. PULS. PROGR.	U_{DATA}	SCHALTSP. DATENBETR. SWITCHING VOLT. DATA MODE TENS. DI COMMUT. DATI TENS. DE COMMUT. FONCT. DONNEES TENS. COMMUT. DATOS
M	SPEICHERTASTE MEMORY BUTTON TASTO DI MEMORIA TOUCHE MEMOIRE PULS. MEMORIA	U_{4.5MHZ}	SCHALTSP. 4,5 MHZ SWITCHING VOLT. 4,5 MHZ TENS. DI COMMUT. 4,5 MHZ TENS. DE COMMUT. 4,5 MHZ TENS. COMMUT. 4,5MHZ
NORM	NORMTASTE TV STANDARD SELECT. BUTTON COMMUT. DI NORMA TOUCHE DE NORME PULS. DE NORMA	U_T	REGELSP. VERZÖGERTE DELAYED CONTR. VOLTAGE TENS. DI CONTR. RITARDE TENS. DE REGUL. RETARDEE TENS. REGUL. RETARDADA
DD+	FEINABST. + FINE TUNING + SINT. FINE + REGLAGE FIN + SINT. FINA +	U_{TUN}	ABSTIMMSP. TUNER TUNING VOLT. TUNER TENS. DI SINTONIA TUNER TENS. D'ACCORD TUNER TENS. SINTONIA AL TUNER
DD-	FEINABST. - FINE TUNING - SINT. FINE - REGLAGE FIN - SINT. FINA -	U_{AFC}	REGELSP. AFC AFC CONTROL VOLT. TENS. DI CONTR. AFC TENS. DE REGUL. AFC TENS. REGUL. CAF
I	SUCHLAUF BD I SELF-SEEK BAND I SINT. AUTOM. BANDA I RECHERCHE AUTOM. BANDE I SINT. AUTOM. BANDA-I	U_{MUTE}	STUMMSCHALTUNG MUTING SILENCIAMENTO SILENCIEUX MUTING
III	SUCHLAUF BANDWAHL III SELF-SEEK BAND III SINT. AUTOM. BANDA III RECHERCHE AUTOM. BANDE III SINT. AUTOM. BANDA-III	U_{PULSE}	TASTIMPULS GATING PULSE IMPULSO A CADENZA IMPULS. DE DECLenchement IMP. PUERTA
UHF	SUCHLAUF UHF SELF-SEEK UHF SINT. AUTOM. UHF RECHERCHE AUTOM. UHF SINT. AUTOM. UHF	U_{VERT.}	VERT. TASTIMPULS VERT. GATING PULSE IMP. A CADENZA VERT. IMP. TRAME IMP. CUADRO
Lautstärke	LAUTSTÄRKE VOLUME VOLUME SONORE VOLUMEN	U_{VERT.}	VERT. PARABEL VERT. PARABOLA PARABOLA VERT. SIGNAL PARABOLIQUE SENAL PARABOL. VERT.
FT	FEINABST. FINE TUNING SINT. FINE REGLAGE FIN SINT. FINA	U_{VERT.}	VERT. SÄGEZAHN VERT. SAW TOOTH DENTE DI SEG. VERT. SIGNAL DENT DE SCIE DIENTE DE SIERRA VERT.
C	KANALWAHL CHANNEL SEL. SELEZ. CANALE SELECT. DE CANAUX SELECCION CANAL	U_{HOR.}	HOR. ANSTEUERUNG HORIZ. DRIVE PILOTTAGGIO ORIZZ. SYNCH. LIGNES EXCITACION HORIZ.
BALANCE	BALANCE BALANCIAM. BALANCE	U_{REF.}	REF. IMPULS REFERENCE PULSE IMP. DI REFER. IMP. DE REFER. IMP. REFERENCIA HORIZ.
SUCHLAUF	SUCHLAUF SELF-SEEK SINT. AUTOM. RECHERCHE AUTOM. SINTONIA AUTOMATICA	U_{PROT.}	SCHUTZSCHALTUNG CIRCUIT PROTECTION CIRCUITO DI PROTEZIONE CIRCUIT DE SECURITE CIRCUITO DE PROTECCION
U_{I/III}	SCHALTSP. BANDWAHL BAND SEL. SWITCHING VOLTAGE TENS. DI COMMUT. SELEZ. BANDA TENS. DE COMMUT. SELECT. BANDE TENS. COMMUT. SELEC. BANDA	U_{TINT.}	FARBTON TINT TINTA TEINTE TINTE
U_{VHF}	SCHALTSP. VHF SWITCHING VOLT. VHF TENS. DI COMMUT. VHF TENS. DE COMMUT. VHF TENS. COMMUT. VHF	U_{REF.}	REF. LAUTSTÄRKE VOLUME REF. VOLT. TENS. DI RIF. VOLUME TENS. DE REF. VOL. SONORE TENS. REF. VOLUMEN
U_{UHF}	SCHALTSP. UHF SWITCHING VOLT. UHF TENS. DI COMMUT. UHF TENS. DE COMMUT. UHF TENS. COMMUT. UHF	U_{BRIGHT.}	HELLIGKEIT BRIGHTNESS LUMINOSITA' LUMINOSITE BRILLO
U_{AFC}	SCHALTSP. AFC SWITCHING VOLT. AFC TENS. DI COMMUT. AFC TENS. DE COMMUT. AFC TENS. COMMUT. CAF	U_{CONTR.}	KONTRAST CONTRAST CONTRASTO CONTRASTE CONTRASTE
U_{AV}	SCHALTSP. AV AV SWITCHING VOLT. TENS. DI COMMUT. AV TENS. DE COMMUT. AV TENS. COMMUT. AV	U_{CONTR.}	FARBKONTRAST CONTRAST COLOUR CONTRASTO COLORE CONTRASTE COULEUR SATUR. COLOR
U_{NORM}	SCHALTSP. NORM SWITCHING VOLT. STANDARD TENS. DI COMMUT. NORMA TENS. DE COMMUT. STANDARD TENS. COMMUT. NORMA	FBAS	FBAS-SIGNAL CCVS SIGNAL SEGNAL SVCC SIGNAL VIDEO COMPOSITE SENAL VIDEO COMUESTA
U_{COINC.}	SCHALTSP. KOINZ. SWITCHING VOLT. COINC. TENS. DI COMMUT. COINC. TENS. DE COMMUT. COINC. TENS. COMMUT. COINCIDENCIA	SSC	SUPERSANDCASTLE
U_{EURO}	SCHALTSP. EURO-AV SWITCHING VOLT. EURO-AV TENS. DI COMMUT. EURO-AV TENS. DE COMMUT. NORME FR TENS. COMMUT. EURO-AV	SB	STRAHLSTR. BEGR. BEAM CURRENT LIM. CORRENTE CATODICA MEDIA LIM. COUR. DE FAISCEAU CORRIENTE MEDIA DE HAZ

SSB	SPITZ. STRAHLSTR. BEGR. PEAK BEAM CURRENT LIMITING CORR. CATODICA DI PICCO LIM. DE FAISCEAU CRETE CORRIENTE PICO DE HAZ
R	ROT-SIGNAL RED SIGNAL SEGNAL ROSSO SIGNAL ROUGE SENAL ROJA
G	GRÜN-SIGNAL GREEN SIGNAL SEGNAL VERDE SIGNAL VERT SENAL VERDE
B	BLAU-SIGNAL BLUE SIGNAL SEGNAL BLEU SIGNAL BLEU SENAL AZUL
Y	Y-SIGNAL SEGNAL Y SIGNAL Y SENAL Y
F	F-SIGNAL CHROMA SIGNAL SEGNAL F SIGNAL CHROMA SENAL CROMA
SW	SCHWARZWERT BLACK LEVEL LIVELLO DEL NERO NIVEAU DU NOIR NIVEL DE NEGRO
AUDIO	AUDIO-SIGNAL SEGNAL AUDIO SIGNAL AUDIO SENAL AUDIO
AUDIO-L	AUDIO SIGNAL LINKS AUDIO SIGNAL LEFT SEGNAL AUDIO SINISTRA SIGNAL AUDIO GAUCHE SENAL AUDIO IZQUIERDA
AUDIO-R	AUDIO SIGNAL RECHTS AUDIO SIGNAL RIGHT SEGNAL AUDIO DESTRA SIGNAL AUDIO DROIT SENAL AUDIO DERECHA
EURO-AV	VIDEO SIGNAL EURO-AV SEGNAL VIDEO EURO-AV SIGNAL VIDEO NORME FR SENAL VIDEO EURO-AV
EURO-AV	AUDIO SIGNAL EURO-AV RECHTS AUDIO SIGNAL EURO-AV RIGHT SEGNAL AUDIO EURO-AV DESTRA SIGNAL AUDIO NORME FR DROIT SENAL AUDIO DERECHA EURO-AV
EURO-AV	AUDIO SIGNAL EURO-AV LINKS AUDIO SIGNAL EURO-AV LEFT SEGNAL VIDEO EURO-AV SINISTRA SIGNAL AUDIO NORME FR GAUCHE SENAL AUDIO IZQUIERDA EURO-AV
IR	IR-SIGNAL SEGNAL IR SIGNAL IR SENAL IR
U_{G1}	SPG. GITTER 1 VOLTAGE GRID 1 TENS. GRIGLIA 1 TENS. GRILLE G1 TENS. REJILLAS G-1
U_{FOC.}	FOKUSSP. FOCUSING VOLTAGE TENS. DI FOCALIZZ. TENS. DE FOCALIS. TENS. FOCALIZACION
U_H	HOCHSPANNUNG EHT VOLTAGE ALTA TENS. HAUTE TENS. MAT
U_{SG}	SCHIRMGITTERSP. SCREEN-GRID VOLT. TENS. GRIGLIA SCHERMO TENS. GRILLE-ECRAN TENS. ACCELERADORES
TE	TEXT ENABLE
SCL	I ² C-CLOCK I ² C-BUS
VCL	VCR-CLOCK
ICL	I-BUS-CLOCK

SDA	DATEN DATA DATI DONNEES DATA
ZF	ZF-SIGNAL IF SIGNAL SEGNAL FI SIGNAL FI SENAL DE FI
PP	PAL PRIORITÄT PAL PRIORITY PRIORITA' PAL PRIORITE PAL PRIORIDAD PAL
F-DIR.	F-SIGNAL DIREKT F SIGNAL DIRECT SEGNAL F DIRETTO SIGNAL CHROMA DIRECT SENAL CROMA DIRECTA
FV	FV-SIGNAL FV SIGNAL SEGNAL FV SIGNAL FV SENAL FV
FU	FU-SIGNAL FU SIGNAL SEGNAL FU SIGNAL FX SENAL FU
F-VERZ.	F-SIGNAL VERZÖGERT F SIGNAL DELAYED SEGNAL F RITARD. SIGNAL CHROMA RETARDE SENAL CROMA RETARDA
DL	VERZÖGERUNGSLEITUNG DELAY LINE LINEA DI RITARDO LIGNE A RETARD LINEA DE RETARDO
U_{PROT.}	SCHALTSP. /SCHUTZFUNKTION SWITCHING VOLT. /PROTECTIVE FUNC. TENS. DI COMMUT. /FUNZ. DI PROTEZ. TENS. DE COMMUT. /SECURITE TENS. COMMUT. /PROTECCION
FBAS	FBAS/SYNC.-SIGNAL CCVS/SYNC. SIGNAL SEGNAL SINC. /VIDEO COL. COMP. SIGNAL SYNC./VIDEO COMPOSITE SENAL SINC./VIDEO COMUESTA
SYNC.	SYNC.-SIGNAL SYNC. SIGNAL SEGNAL SINC. SIGNAL SYNC. SENAL DE SINCRONISMOS
U_{50/60}	SCHALTSP. 50/60HZ SWITCHING VOLT. 50/60HZ TENS. DI COMMUT. 50/60HZ TENS. DE COMMUT. 50/60HZ TENS. COMMUT. 50/60HZ
U_{BTX}	SCHALTSP. BTX SWITCHING VOLT. BTX (VIEWDATA) TENS. COMMUT. VIDEOTEL TENS. COMMUT. VIDEOTEXT TENS. COMMUT. VIDEOTEXT
SYNC. VT	SYNC. VT SYNC. VT (TELETEXT) SINC. VIDEOTEL SYNC. TELETEXTE SINC. TELETEXTO
SYNC. BTX	SYNC. BTX SYNC. BTX (VIEWDATA) SINC. VIDEOTEL SYNC. VIDEOTEXT SINC. VIDEOTEXT
U_{RESET}	SCHALTSP. RESET SWITCHING VOLT. RESET TENS. COMMUT. RESET TENS. COMMUT. RESET
U_{STAND BY}	SCHALTSP. STAND BY SWITCHING VOLT. STAND BY TENS. COMMUT. STAND BY TENS. COMMUT. VEILLE TENS. COMMUT. STAND BY
U_{HUB}	SCHALTSP. HUB SWITCHING VOLT. DEVIATION TENS. COMMUT. DEVIATION TENS. COMMUT. DEVIATION TENS. COMMUT. DESVIACION
U_{DEEM}	SCHALTSP. DEEM SWITCHING VOLT. DEEMPHASIS TENS. COMMUT. DEENFASI TENS. COMMUT. DEACCENT. TENS. COMMUT. DEENFASIS
U_{REPR.}	SCHALTSP. KAMERA WIEDERG. SWITCHING VOLT. CAMERA PLAYBACK TENS. COMMUT. RIPRODUZ. TELECAM. TENS. COMMUT. REPRD. CAMERA TENS. COMMUT. REPRD. CAMARA
U_{LED}	SCHALTSP. LED LED SWITCHING VOLT. LED TENS. DI COMMUT. TENS. DE COMMUT. LED TENS. COMMUT. LED

	ZEILENBREITE LINE WIDTH LARGHEZZA DI RIGA AMPLITUDE HORIZONTAL AMPLITUD HORIZONTAL
	OST / WEST AMPLITUDE EAST / WEST AMPLITUDE AMPIEZZA EST / OVEST AMPLITUDE EST / OUEST AMPLITUD E/O
	HOR. LINEARITÄT HORIZ. LINEARITY LINEAR. ORIZZ. LINEAR. HORIZONTAL LINEAL. HORIZONTAL
	BILDAGE HOR. HORIZ. PICTURE POSITION POSIZ. VERT. D'IMMAGINE CADRAGE HORIZONTAL CENTRADO HORIZONTAL
	FOKUSREGLER FOCUS CONTROL REGOLAT. DI FOCALIZZ. REGLAGE DE FOCALISATION CONTROL DE FOCO
	BILDAGE VERT. VERT. PICTURE POSITION POSIZ. VERT. D'IMMAGINE CADRAGE VERTICAL CENTRADO VERTICAL
	BILDAMPLITUDE FIELD AMPLITUDE AMPIEZZA D'IMMAGINE AMPLITUDE VERTICALE AMPLITUD VERTICAL
	TRAPEZ TRAPEZIUM TRAPEZIO TRAPEZE TRAPEZIO
	HOR. FREQUENZ HOR. FREQUENCY FREQ. ORIZZ. FREQ. HORIZ. FRECUENCIA HORIZONTAL
	VERT. FREQUENZ VERT. FREQUENCY FREQ. VERT. FRECUENCIA VERTICAL
	VERT. LINEARITÄT VERT. LINEARITY LINEAR. VERT. LINEAL. VERTICAL
	OST/WEST SYMMETRIE EAST/WEST SYMMETRY SIMMETRIA EST/OVEST SYMMETRIE EST/OUEST SIMETRIA E/O

Wichtige Schaltzeichen
Important circuit symbols
Segni circuitali importanti

	3/4W 0817 DIN
	1/10W 0204 DIN
	1/4W 0207 DIN
	1/2W 0411 DIN
	1W 0411 DIN
	2W 0617 DIN
	4W 0922 DIN
	TDA 4801
	BF 199
	78 L05 CP
	BF 421 / BF 422
	BC 637 / BC 423
	BC 548 / BC 558
	BC 337 / 25
	PH 2222
	BC 558 / BC 324
	BF 414
	BC 308 / BC 248
	BC 547
	250V-
	400V-
	630V-
	1000V-
	BU 508A / BU 903
	BU 508D / BU 908
	BU 208A
	BU 546
	TY 40184 / MC 7505
	BU 908
	BU 903
	S 6687
	BUT 11A
	BUT 56A
	TDA 2653A
	BD 561 G
	BD 159
	TDA 8170
	TDA 4935
	DL 60292
	TDA 2040
	TDA 3654
	TDA 3653A
	SOT 143
	G1 G2
	SOT 23
	E B
	BF 994
	BF 996
	BF 569
	BF 579

Wichtige Schaltzeichen
Important circuit symbols
Segni circuitali importanti

HLSTR. BEGR.
 CURRENT LIMITING
 CA DI PICCO
 CEAU CRETE
 CO DE HAZ

SSO
 E

L
 DE

AL

MA

NERO

BIR

GRÖ

LINKS

L LEFT

IO SINISTRA

O GAUCHE

IZQUIERDA

RECHTS

R RIGHT

IO DESTRA

O DROIT

DERECHA

L EURO-AV

EO EURO-AV

O NORME FR

EURO-AV

L EURO-AV

RECHTS

L EURO-AV

RIGHT

IO DESTRA

O DROIT

DERECHA

L EURO-AV

LEFT

IO SINISTRA

O NORME FR

GAUCHE

IZQUIERDA

EURO-AV

L EURO-AV

LINKS

L EURO-AV

RIGHT

IO DESTRA

O NORME FR

GAUCHE

IZQUIERDA

EURO-AV

L EURO-AV

LEFT

IO SINISTRA

O NORME FR

GAUCHE

IZQUIERDA

EURO-AV

L EURO-AV

LEFT

IO SINISTRA

O NORME FR

GAUCHE

IZQUIERDA

EURO-AV

SDA

DATEN
 DATA
 DATI
 DONNEES
 DATA

ZF

ZF-SIGNAL
 IF SIGNAL
 SEGNALE FI
 SIGNAL FI
 SENAL DE FI

PP

PAL PRIORITÄT
 PAL PRIORITY
 PRIORITA' PAL
 PRIORITE PAL
 PRIORIDAD PAL

F-DIR.

F-SIGNAL DIREKT
 F SIGNAL DIRECT
 SEGNALE F DIRETTO
 SIGNAL CHROMA DIRECT
 SENAL CROMA DIRECTA

FV

FV-SIGNAL
 FV SIGNAL
 SEGNALE FV
 SIGNAL FV
 SENAL FV

FU

FU-SIGNAL
 FU SIGNAL
 SEGNALE FU
 SIGNAL FU
 SENAL FU

F-VERZ

F-SIGNAL VERZÖGERT
 F SIGNAL DELAYED
 SEGNALE F RITARD
 SIGNAL CHROMA RETARDE
 SENAL CROMA RETARDADA

DL

VERZÖGERUNGSLEITUNG
 DELAY LINE
 LINEA DI RITARDO
 LIGNE A RETARD
 LINEA DE RETARDO

U SCHUTZ

SCHALTSP. / SCHUTZFUNKTION
 SWITCHING VOLT. / PROTECTIVE FUNC.
 TENS. DI COMMUT. / FUNZ. DI PROTEZ.
 TENS. DE COMMUT. / SECURITE
 TENS. COMMUT. / PROTECCION

FBAS SYNC.

FBAS/SYNC.-SIGNAL
 CCVS/SYNC. SIGNAL
 SEGNALE SINCR. / VIDEO COL. COMP.
 SIGNAL SYNC./VIDEO COMPOSITE
 SENAL SINCR./VIDEO COMPUSTA

SYNC.

SYNC.-SIGNAL
 SYNC. SIGNAL
 SEGNALE SINCR.
 SIGNAL SYNC.
 SENAL DE SINCRONISMO

U 50/60

SCHALTSP. 50/60HZ
 SWITCHING VOLT. 50/60HZ
 TENS. DI COMMUT. 50/60HZ
 TENS. DE COMMUT. 50/60HZ
 TENS. COMMUT. 50/60HZ

U BTX

SCHALTSP. BTX
 SWITCHING VOLT. BTX (VIEWDATA)
 TENS. COMMUT. VIDEOTEL
 TENS. COMMUT. VIDEOTEXT
 TENS. COMMUT. VIDEOTEXT

SYNC. VT

SYNC. VT (TELETEXT)
 SINCR. TELEVIDEO
 SYNC. TELETEXTE
 SINCR. TELETEXTO

SYNC. BTX

SYNC. BTX (VIEWDATA)
 SINCR. VIDEOTEL
 SYNC. VIDEOTEXT
 SINCR. VIDEOTEXT

U RESET

SCHALTSP. RESET
 SWITCHING VOLT. RESET
 TENS. COMMUT. RESET
 TENS. COMMUT. RESET

U STAND BY

SCHALTSP. STAND BY
 SWITCHING VOLT. STAND BY
 TENS. COMMUT. STAND BY
 TENS. COMMUT. VEILLE
 TENS. COMMUT. STAND BY

U HUB

SCHALTSP. HUB
 SWITCHING VOLT. DEVIATION
 TENS. COMMUT. DEVIATION
 TENS. COMMUT. DEVIATION
 TENS. COMMUT. DESVIACION

U DEEM

SCHALTSP. DEEM
 SWITCHING VOLT. DEEMPHASIS
 TENS. COMMUT. DEENFASI
 TENS. COMMUT. DESACCENT
 TENS. COMMUT. DEENFASIS

U CAM. JAV

SCHALTSP. KAMERA WIERERG.
 SWITCHING VOLT. CAMERA PLAYBACK
 TENS. COMMUT. RIPRODUZ. TELECAM.
 TENS. COMMUT. REPROD. CAMERA
 TENS. COMMUT. REPROD. CAMARA

U LED

SCHALTSP. LED
 LED SWITCHING VOLT.
 LED TENS. DI COMMUT.
 TENS. DE COMMUT. LED
 TENS. COMMUT. LED

ZEILENBREITE

LINE WIDTH
 LARGHEZZA DI RIGA
 AMPLITUDE HORIZONTALE
 AMPLITUD HORIZONTAL

OST / WEST AMPLITUDE

EAST / WEST AMPLITUDE
 AMPIEZZA EST / OVEST
 IC'S VISTI DI SOTTO
 IC'S VUS DU DESSOUS

HOR. LINEARITÄT

HORIZ. LINEARITY
 LINEAR. ORIZZ.
 LINEAR. HORIZONT.
 LINEAL. HORIZONTAL

BILDAGE HOR.

HORIZ. PICTURE POSITION
 POSIZIONE ORIZZ. D'IMMAGINE
 CADRAGE HORIZONT.
 CENTRADO HORIZONTAL

FOKUSREGLER

FOCUS CONTROL
 REGOLAT. DI FOCALIZZ.
 REGLAGE DE FOCALISATION
 CONTROL DE FOCO

BILDAGE VERT.

VERT. PICTURE POSITION
 POSIZ. VERT. D'IMMAGINE
 CADRAGE VERTICAL
 CENTRADO VERTICAL

BILDAMPLITUDE

FIELD AMPLITUDE
 AMPIEZZA D'IMMAGINE
 AMPLITUDE VERTICALE
 AMPLITUD VERTICAL

TRAPEZ

TRAPEZIUM
 TRAPEZIO
 TRAPEZE
 TRAPÉCIO

HOR. FREQUENZ

HOR. FREQUENCY
 FREQ. ORIZZ.
 FREQ. HORIZ.
 FRECUENCIA HORIZONTAL

VERT. FREQUENZ

VERT. FREQUENCY
 FREQ. VERT.
 FRECUENCIA VERTICAL

VERT. LINEARITÄT

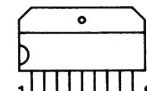
VERT. LINEARITY
 LINEAR. VERT.
 LINEAR. VERT.
 LINEALIDAD VERTICAL

OST/WEST SYMMETRIE

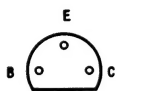
EAST/WEST SYMMETRY
 SIMMETRIA EST/OVEST
 SYMMETRIE EST/OUEST
 SIMETRIA E/O



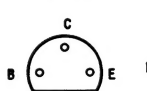
IC'S VON UNTEN GEGEHEN
 IC'S SEEN FROM BOTTOM
 IC'S VISTI DI SOTTO
 IC'S VUS DU DESSOUS



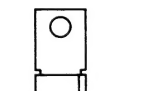
TDA 4601



BF 199



BC 421 / BF 422
 BC 637 / BF 423



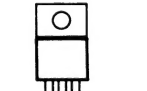
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 BC 337 / 25
 PH 2222
 BC 338 / BC 324
 BF 414
 BC 308 / BC 248
 BC 547



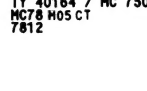
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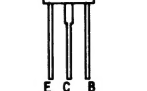
BU 508A / BU 903
 BU 508D / BU 908



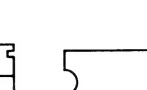
BU 208A
 BU 546



TY 40164 / MC 7505
 MC78 M05 CT
 7812



BD 581 G
 BD 139



TDA 8170



TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

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TDA 2040

TDA 3654
 TDA 3653A

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TDA 2040

TDA 3654
 TDA 3653A

TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

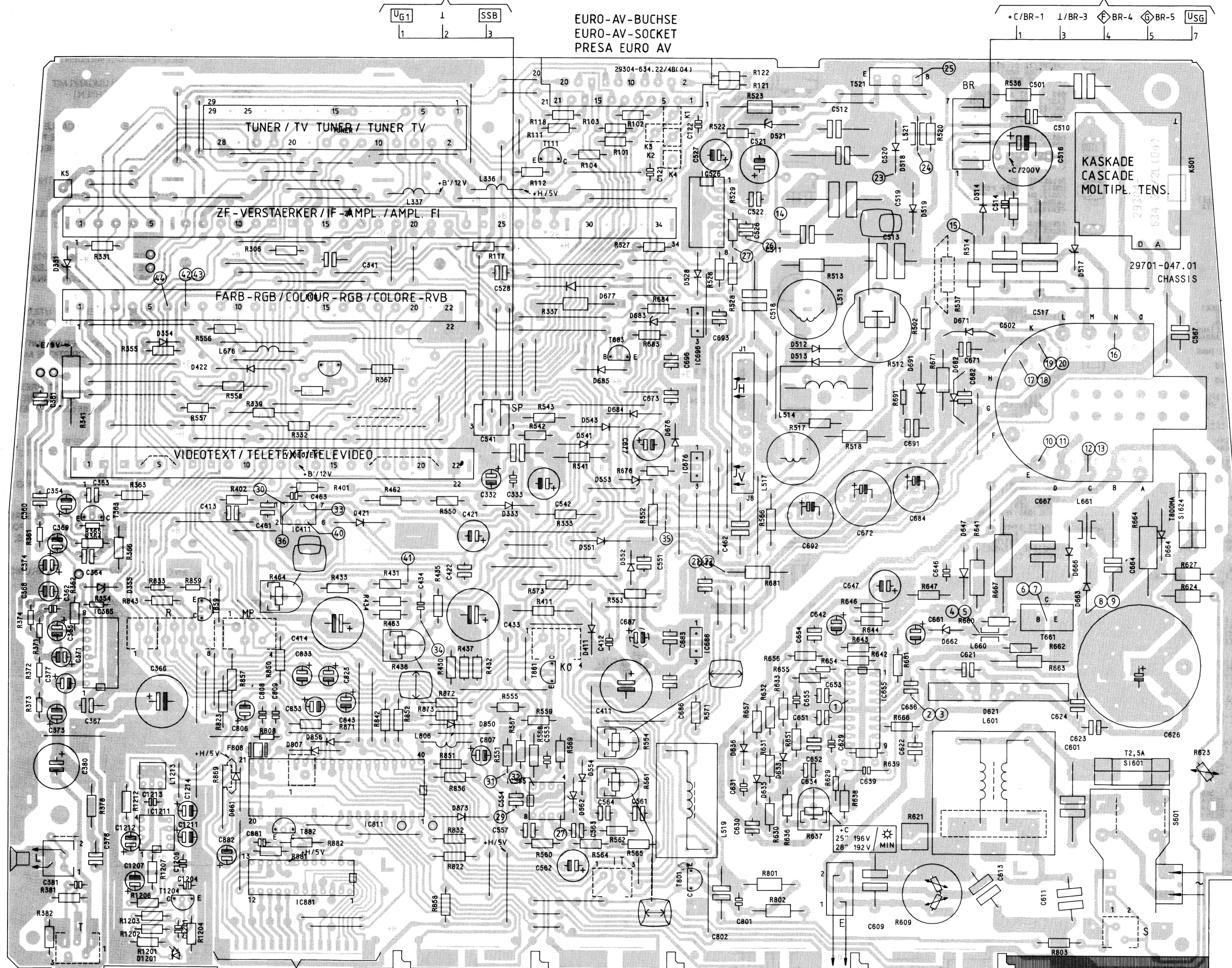
TDA 4935

DL 60292

TDA 2040

TDA 3654
 TDA 3653A

EURO-AV-BUCHSE
EURO-AV-SOCKET
PRESA EURO AV



LED-PLATTE / LED BOARD / PIASTRA LED

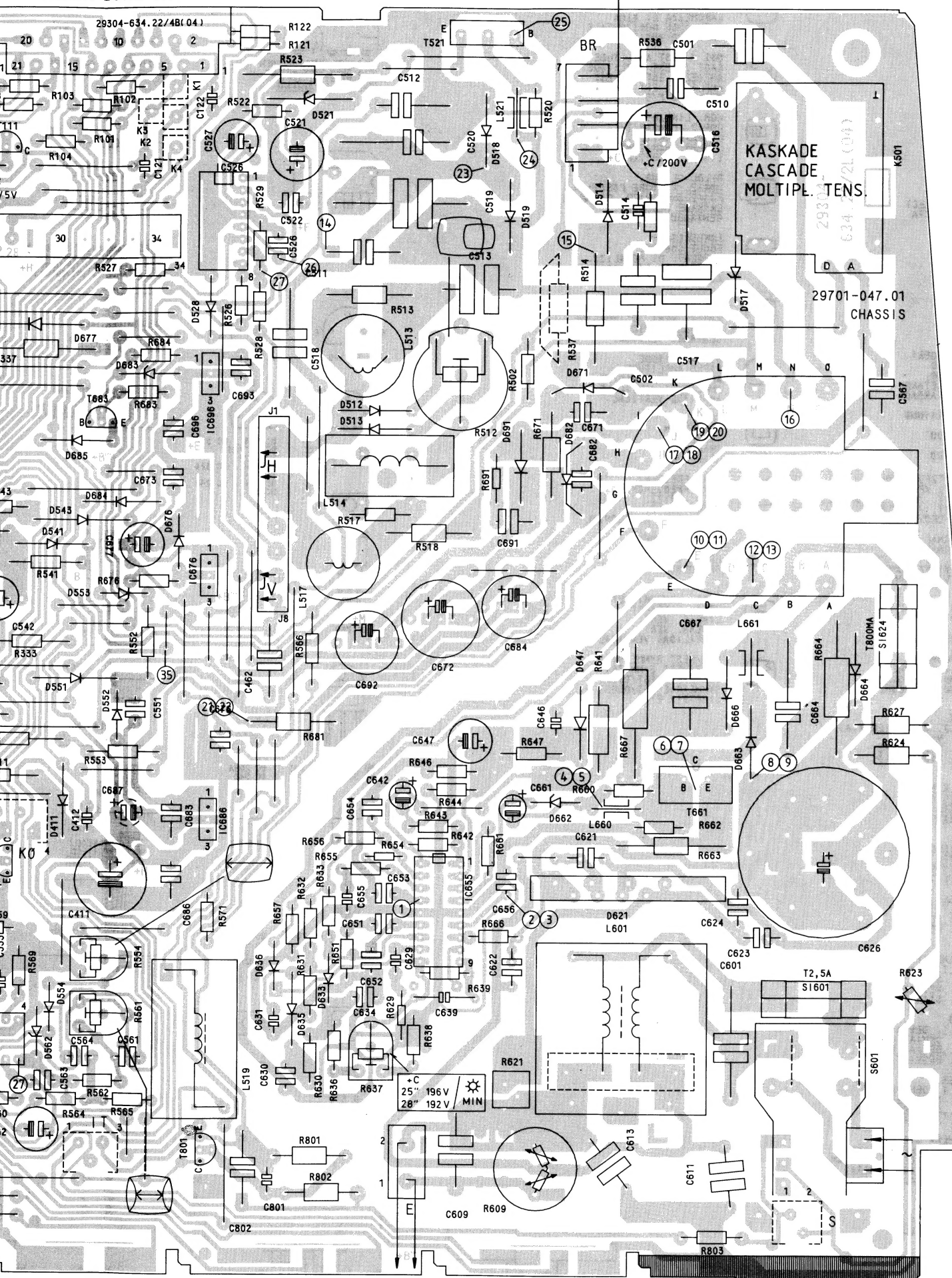
ENTMAGNETISIERUNG / DEGAUSSING / SMAGNETIZZAZIONE

FARB / RGB - STECKKARTE
COLOUR / RGB
COLORE / RVB

EURO-AV-BUCHSE
EURO-AV-SOCKET
PRESA EURO AV

BILDROHRPLATTE / CRT BASE / PIASTRA CINESC.

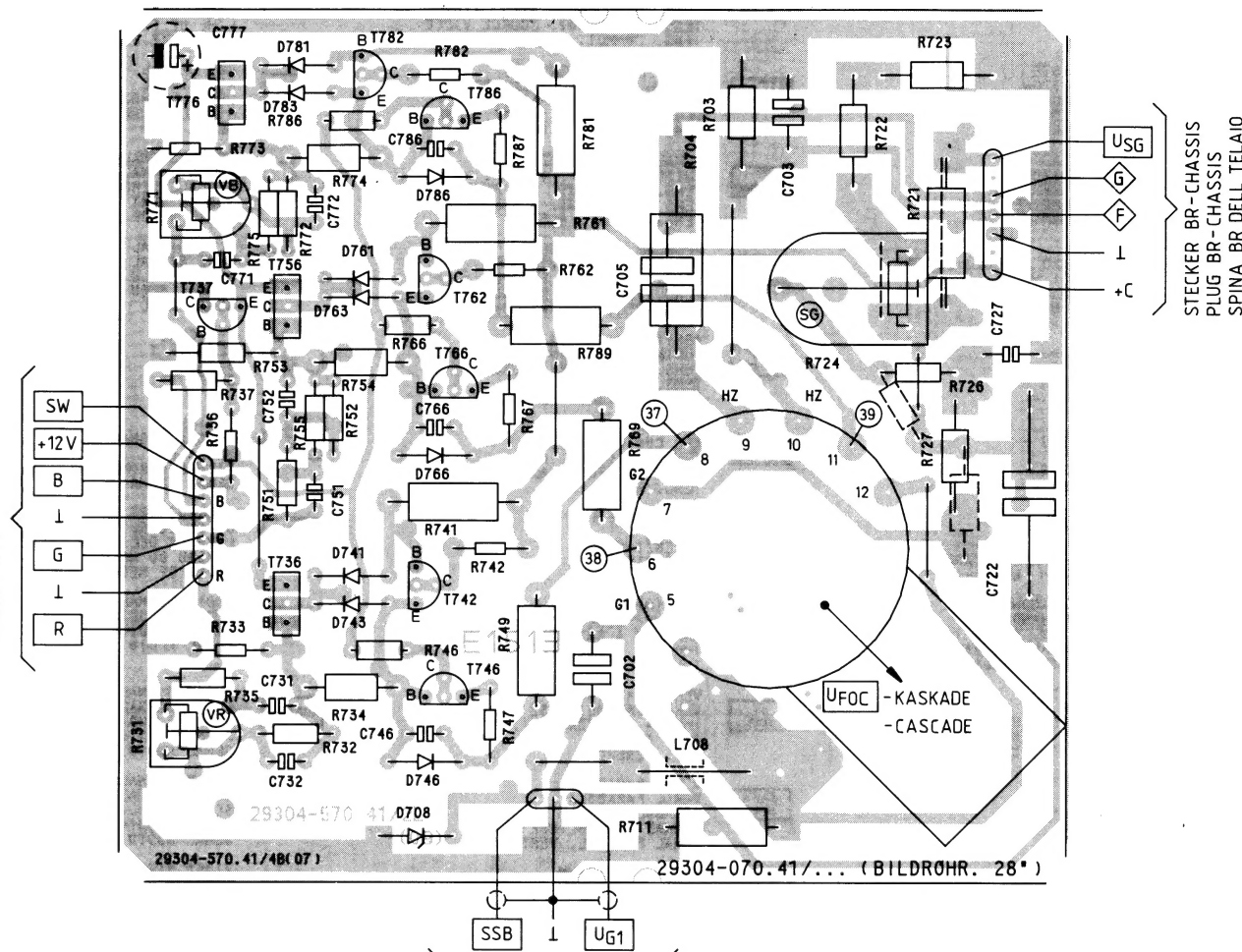
+C/BR-1 1/BR-3 BR-4 BR-5 USG
1 3 4 5 7



ENTMAGNETISIERUNG / DEGAUSSING / SMAGNETIZZAZIONE

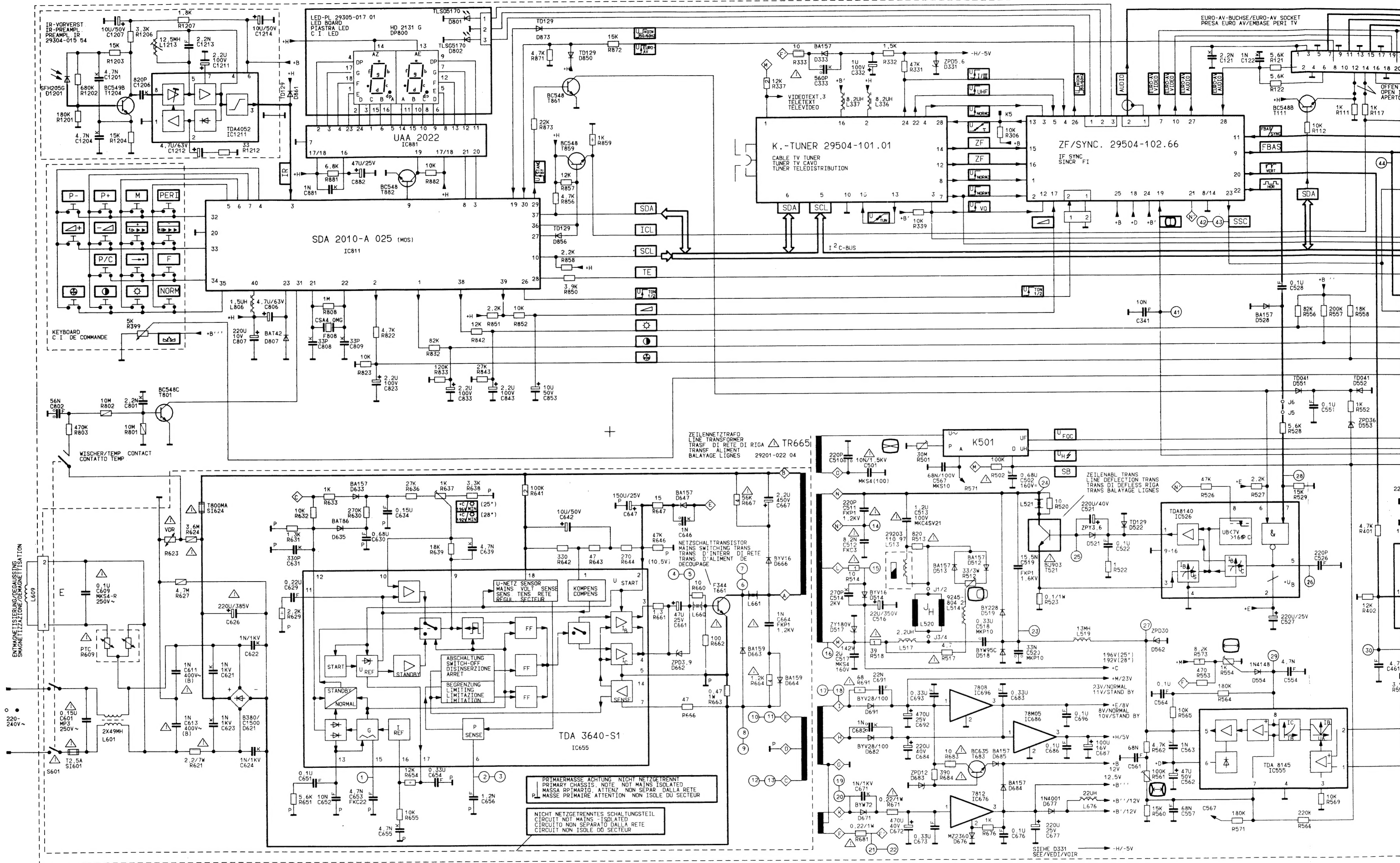
BILDROHRPLATTE
CRT BASE
PIASTRA CINESC.

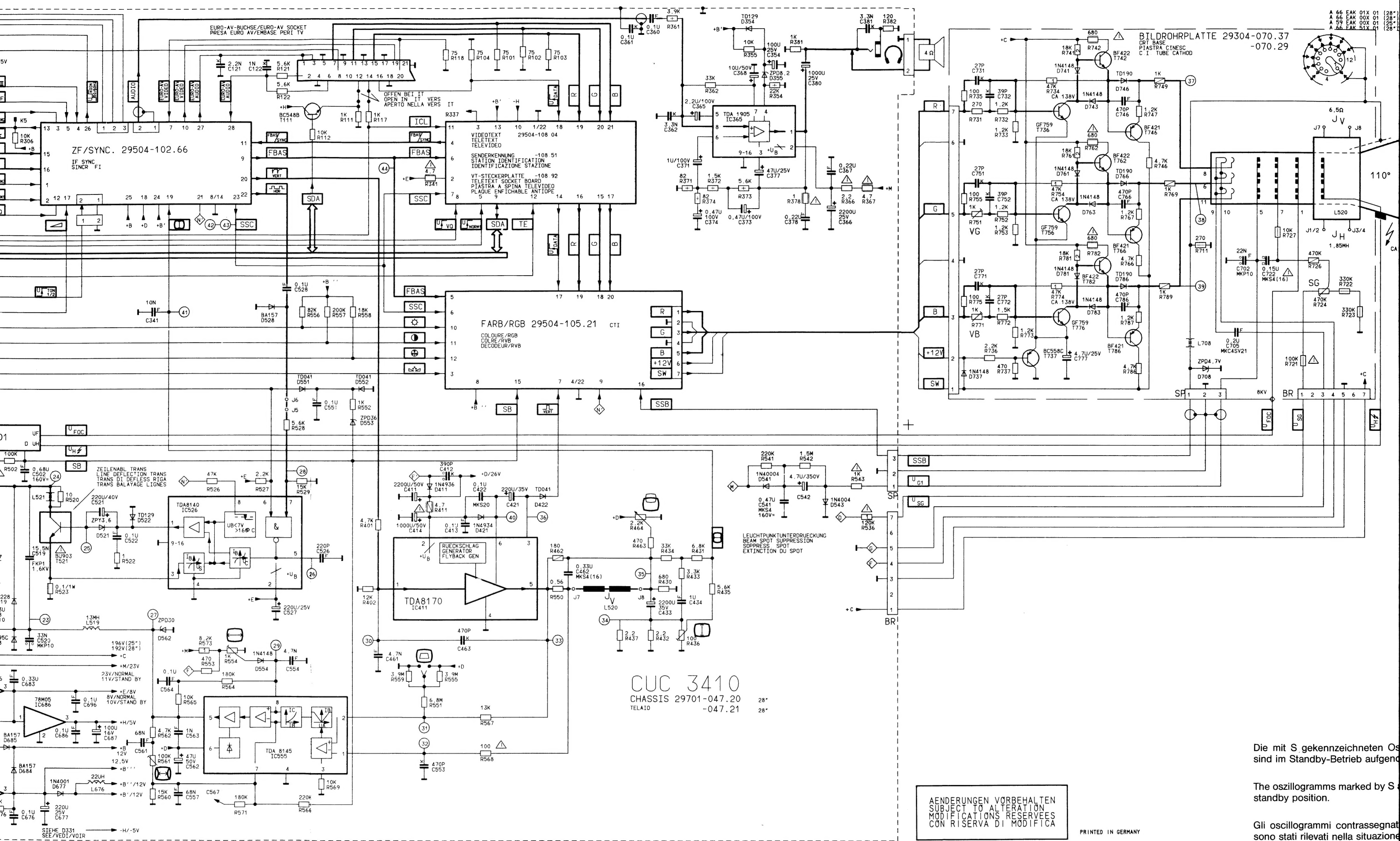
FARG / RGB - STECKKARTE
COLOUR / RGB
COLORE / RVB



STECKER SP-CHASSIS
PLUG SP-CHASSIS
SPINA SP DELL TELAIO

STECKER BR-CHASSIS
PLUG BR-CHASSIS
SPINA BR DELL TELAIO

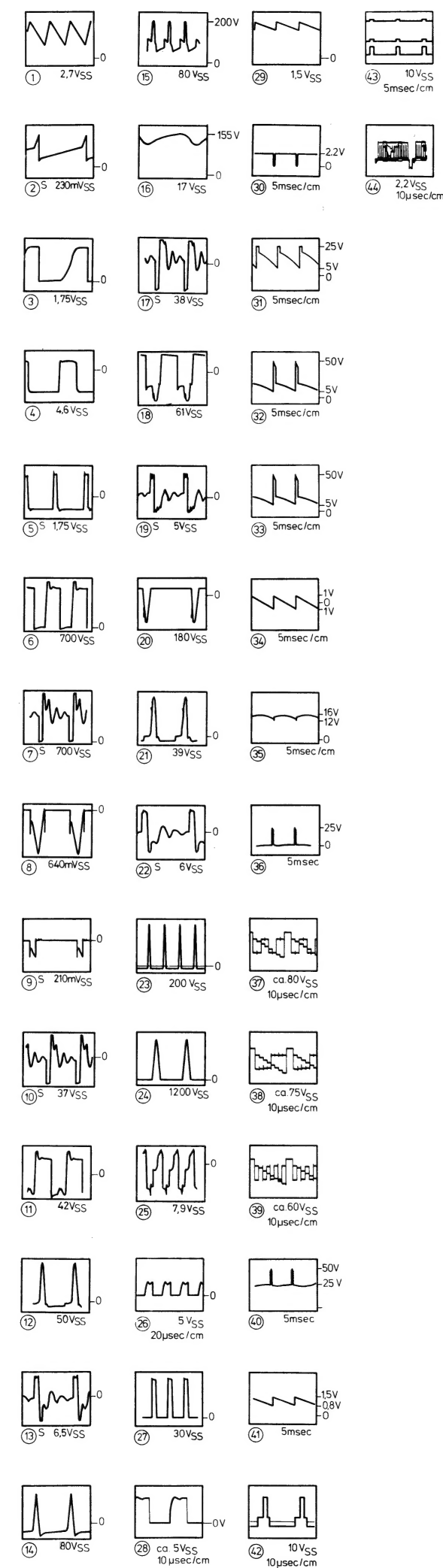




Die mit S gekennzeichneten Os
sind im Standby-Betrieb aufgen

The oszillogramms marked by S
standby position.


Gli oscillogrammi contrassegnati
sono stati rilevati nella situazione




PRINTED IN GERMANY

Bei Fehlfunktionen des Gerätes, die nicht auf Netzteil, Hochspannung und Ablenkung zurückzuführen sind, ist der I²C-Bus gemäß Tabelle 1 zu prüfen, bevor weitere Servicearbeiten nach Tabelle 2 durchgeführt werden.
Der µComputer in der Bedieneinheit IC 811 liefert Steuerbefehle für Tuner, Videotext, T 111 (zur EURO-AV-BUCHSE) über den I²C Bus.
Hinweis:
Bei Modulwechsel ist das Gerät generell auszuschalten!
Auch in Stellung »Bereitschaft« darf kein Modul gezogen werden! MOS-handling beachten.


Messung	Meßwert	Meßpunkt	Mögliche Fehler
+ H	5 V	Pin 40, IC 811	D 682, IC 686, IC 811
4 MHz Takt Reset	4 MHz, 3 V _{ss} 4 V _{ss} nur im Einschaltmoment	Pin 22, IC 811 Pin 23	F 808, IC 811 C 806, D 807, IC 811
I ² C Bus	5 V _{ss}	Pin 10, 37, IC 811	Die I ² C-Bus-Daten sind auch ohne TP-Bedienung oder Keyboardeingabe vorhanden. Bei fehlenden Daten: Die Leitungen SDA und SCL auftrennen. Sind dann die I ² C-Bus-Daten vorhanden, liegt eine Überlastung des I ² C-Bus vor. Fehlerursache: Tuner, Videotext, T 111.

Fehler	Mögliche Ursache	Meßwert	Meßpunkt
Keine Frequenzabstimmung	Tuner (Speicher, PLL)	+ 0,2–30 V	Pin 13, 15
	+ B' + H 	+ 12V + 5V ca. + 45 V	Tuner Pin 16 Tuner Pin 2 Tuner Pin 1
Keine Bedienfunktion	+ H, IC811	+ 5 V	IC811 Pin 40
LED falsche Anzeige	IC811		
	F 808	4 MHz, 3 V	IC811 Pin 22
Kein Ton	Keine Koinzidenz- kennung (ZF- Verstärker	>3 V	IC811 Pin 19
	IC365	+ M/ca. 23 V	IC365 Pin 2
Keine Programm- schaltung mit TP	IR-Vorverstärker	IR-Signal 5 V _{ss}	IC811 Pin 3
Keine Analogwerte für Helligkeit Kontrast Farbkontrast	IC811, C843 IC811, C833 IC811, C823	1-3V 2-4V 2-4 V	Farb/RGB Pin 10 Farb/RGB Pin 11 Farb/RGB Pin 12
Beim Einschalten mit der Netztaaste schaltet das Gerät auf Bereit- schaft.	T801	beim Einschalten kurzzeitig »LOW« (Kollektor)	IC811 Pin 31
Kein FBAS-Signal	Tuner	ca. 10 V	Tuner Pin 3
	ZF-Verstärker	ca. 10 V	ZF/SYNC. Pin 12
	+ B, + B'	+ 12V	ZF/SYNC. Pin 25, 24
Gerät geht nicht in den Betriebs- zustand – akustisches Schwirren.	C653 Toleranz zu groß oder defekt	① Tastkopf 1:10	IC655 Pin 15

Test	Test Figures	Test Point	Possible faults
+ H	5 V	Pin 40, IC 811	D 682, IC 686, IC 811
4 MHz clock Reset	4 MHz, 3 V _{pp} 4 V _{pp} only at moment of switch on	Pin 22, IC 811 Pin 23	F 808, IC 811 C 806, D 807, IC 811
I ² C bus	5 V _{pp}	Pin 10, 37, IC 811	The I ² C bus data are present even without input from the remote control or keyboard. If data are absent disconnect the SDA and SCL lines. If data are then present on the I ² C bus, the I ² C bus is overloaded. Possible faults: Tuner, Videotext (Teletext), T 111

Fault	Possible Cause	Test Figure	Test Point
No frequency tuning	Tuner (memory, PLL)	+ 0,2–30 V	Pin 13, 15
	+ B' + H 	+ 12V + 5V ca. + 4.5 V	Tuner pin 16 Tuner pin 2 Tuner pin 1
No functions accepted	+ H, IC 811	+ 5 V	IC 811 pin 40
Incorrect LED indication	IC 811		
	F 808	4 MHz, 3 V	IC 811 pin 22
No sound	No coincidence identification (IF)	>3 V	IC 811 pin 19
	IC 365	+ M/about 23 V	IC 365 pin 2
Programme cannot be changed with remote control	IR-preamplifier	IR-signal 5 V _{pp}	IC 811 pin 3
No analog signals for Brightness Contrast Colour contrast	IC 811, IC 843 IC 811, C 833 IC 811, C 823	1-3V 2-4V 2-4V	Colour/RGB, pin 10 Colour/RGB, pin 11 Colour/RGB, pin 12
Set switches to standby mode on operation of power button	T 801	Short-time "LOW" on switch-on (collector)	IC 811, pin 31
No CCVS	Tuner	approx. 10 V	Tuner, pin 3
	IF	approx. 10 V	IF-SYNC., pin 12
	+ B, + B'	+ 12 V	IF-SYNC., pin 25, 24
Receiver does not go to working order – audible whistle	C 653 Tolerance too large or capacitor defective	① Probe 1:10	IC 655 Pin 15

Misura	Valore di misura	Punto di misura	Possibili guasti
+ H	5 V	Pin 40, IC 811	D 682, IC 686, IC 811
Cadenza 4 MHz Reset	4 MHz, 3 V _{pp} 4 V _{pp} solo all'atto dell'accensione	Pin 22, IC 811 Pin 23	F 808, IC 811 C 806, D 807, IC 811
Bus I ² C	5 V _{pp}	Pin 10, 37, IC 811	I dati nel bus I ² C sono presenti anche senza comando da TP o immissione tramite tastiera. Se i dati mancano: interrompere le linee SDA e SCL. Se ora i dati sono presenti, nel bus I ² C c'è un sovraccarico. Possibili cause del guasto: tuner, televideo, T 111

Guasto	Possibile causa	Valore de misura	Punto di misura
Non é possibile sintonizzare la frequenza	Tuner (memoria, PLL)	+ 0,2–30 V	Pin 13, 15
	+ B' + H 	+ 12V + 5V ca. + 45 V	Tuner Pin 16 Tuner Pin 2 Tuner Pin 1
Nessuna funzione viene accettata	+ H, IC811	+ 5 V	IC811 Pin40
Indicazione LED errata	IC811		
	F 808	4 MHz, 3 V	IC811 Pin22
Manca l'audio	Nessun riconoscimento di coincidenza (FI)	>3 V	IC811 Pin 19
	IC365	+ M/ca. 23 V	IC365 Pin2
Non viene commutato il programma con TP	Preamplif. IR	Segnale IR 5 V _{pp}	IC811 Pin3
Manca il valore analogico per luminosità contrasto contrasto colore	IC 811, C843 IC 811, C833 IC 811, C823	1-3 V 2-4 V 2-4 V	Colore/RGB Pin 10 Colore/RGB Pin 11 Colore/RGB Pin 12
Accendendo con tasto rete l'apparecchio commuta in posizione d'attesa	T 801	All'atto dell'accensione brevemente «LOW» (collettore).	IC 811 Pin 31
Nessun segnale FBAS	Tuner	ca. 10V	Tuner Pin 3
	IF	ca. 10V	SYNCR. FI Pin 12
	+ B, + B'	+ 12V	SYNCR. FI Pin 25, 24
L'apparecchio non va in posizione di funzionamento (ronzio)	C 653, tolleranza troppo grande e difettoso	①, sonda dell'oscillografo 1:10	IC 655 Pin 15

- zu geringer Betriebsspannung
- Störimpulsen (falsche Steuerung)
- überhöhter Kristalltemperatur

ende nè dall'alimentatore, nè dall'alta
2°C secondo la tabella ; prima di effet-
e istruzioni per tuner, televideo, T 111
modulo! Non togliere il modulo mem-
zione alle norme MOS.

ra	Possibili guasti
	D 682, IC 686, IC 811
	F 808, IC 811 C 806, D 807, IC 811
1	I dati nel bus I ² C sono presenti anche senza comando da TP o immissione tramite tastiera. Se i dati mancano: interrompere le linee SDA e SCL. Se ora i dati sono presenti, nel bus I ² C c'è un sovraccarico. Possibili cause del guasto: tuner, televideo, T 111

le misura	Punto di misura
0 V	Pin 13, 15
5 V	Tuner Pin 16 Tuner Pin 2 Tuner Pin 1
	IC 811 Pin 40
3 V	IC 811 Pin 22
	IC 811 Pin 19
23 V	IC 365 Pin 2
IR 5 V _{pp}	IC 811 Pin 3
dell'accensio- namento «LOW» ore).	Colore/RGB Pin 10 Colore/RGB Pin 11 Colore/RGB Pin 12
	IC 811 Pin 31
	Tuner Pin 3
	SYNCR. FI Pin 12
	SYNCR. FI Pin 25, 24
a dell' grafo 1:10	IC 655 Pin 15

Funktionsüberblick

Das GRUNDIG Zeilennetzteil hat 2 Merkmale:

- Den Zeilennetztrafo (ZNT) mit einem Ferritkern. Dieser Trafo hat Wicklungen für Netzteil und Zeilenendstufe.
- Die Netzteilfrequenz entspricht der Zeilenfrequenz.

Der ZNT dient der galvanischen Trennung, der Zeilenablenkung und der Erzeugung der Betriebsspannung. Durch feste und lose Kopplung der Wicklungen des ZNT wird erreicht, daß die Betriebsspannungen ausreichend belastbar sind, und keine nennenswerte Rückwirkung auf die Zeilenträfowicklung N-M entsteht.

Die Anlaufschaltung

Die Anlaufspannung erhält IC 655 vom Brückengleichrichter D 621 über R 641. Werden über die Widerstände R 642, 643 und 644 an Pin 2 ca. 10 V erreicht, steuert IC 655 über Pin 3 T 661 an (Voraussetzung: Pin 18 > 10 V). Das Zeilennetzteil schwingt an. Gleichzeitig steigt über Pin 2 die Stromaufnahme, und die Wicklung E/D des ZNT übernimmt die weitere Betriebsspannungsversorgung (D 647, R 647, C 647).

Der Oszillator im IC TDA 3640

Die Steuerimpulse für T 661 erzeugt ein Oszillator, der nach dem Schwellwertprinzip arbeitet. C 653 ist ein extern beschaltetes frequenzbestimmendes Glied (Synchronbereich des Oszillators ca. 14-17 kHz). Der Oszillator schwingt so lange frei, bis die Referenzimpulse vom ZNT an Pin 12 größer als +1 V_s sind.

Bei Vollbetrieb (EIN) stehen an Pin 12 ca. +5 V_s.

Die Zeilenendstufe

Im Stand-by-Betrieb ist der Ablenktransistor T 521 leitend. Periodisches zeilenfrequentes Ansteuern des Ablenktransistors entspricht dem Betriebszustand »EIN«. Die Energie für den Zeilenablenkkreis wird aus der EMK der Spule M-N gewonnen. Somit braucht T 521 keine zusätzliche Betriebsspannung.

Die Spannungsstabilisierung

In »stand-by« wird der Impuls der Wicklung E-D (feste Kopplung mit Wicklung A-B) als Referenz zur Stabilisierung herangezogen. Regelgröße an Pin 2 IC TDA 3640 ist +10,5 V.

Bei Vollbetrieb »EIN« muß die Spannung im Zeilenablenkkreis (Trafowicklung M-N) stabil gehalten werden. Dies geschieht über den Referenzimpuls der Wicklung C-D, die mit der Wicklung M-N fest gekoppelt ist. Die über D 633 gewonnene Gleichspannung ist proportional zur Bildbreite bzw. Hochspannung und wird über Pin 10 mit der an Pin 11 meßbaren Referenzspannung (ca. 3 V) verglichen. In diesem Regelzweig wird die +C-Spannung mit R 637 eingestellt. Bei 25"-Geräten auf 196 V und bei 28"-Geräten auf 192 V.

Schutzschaltungen des TDA 3640.

Es erfolgt sofortige Abschaltung bei:

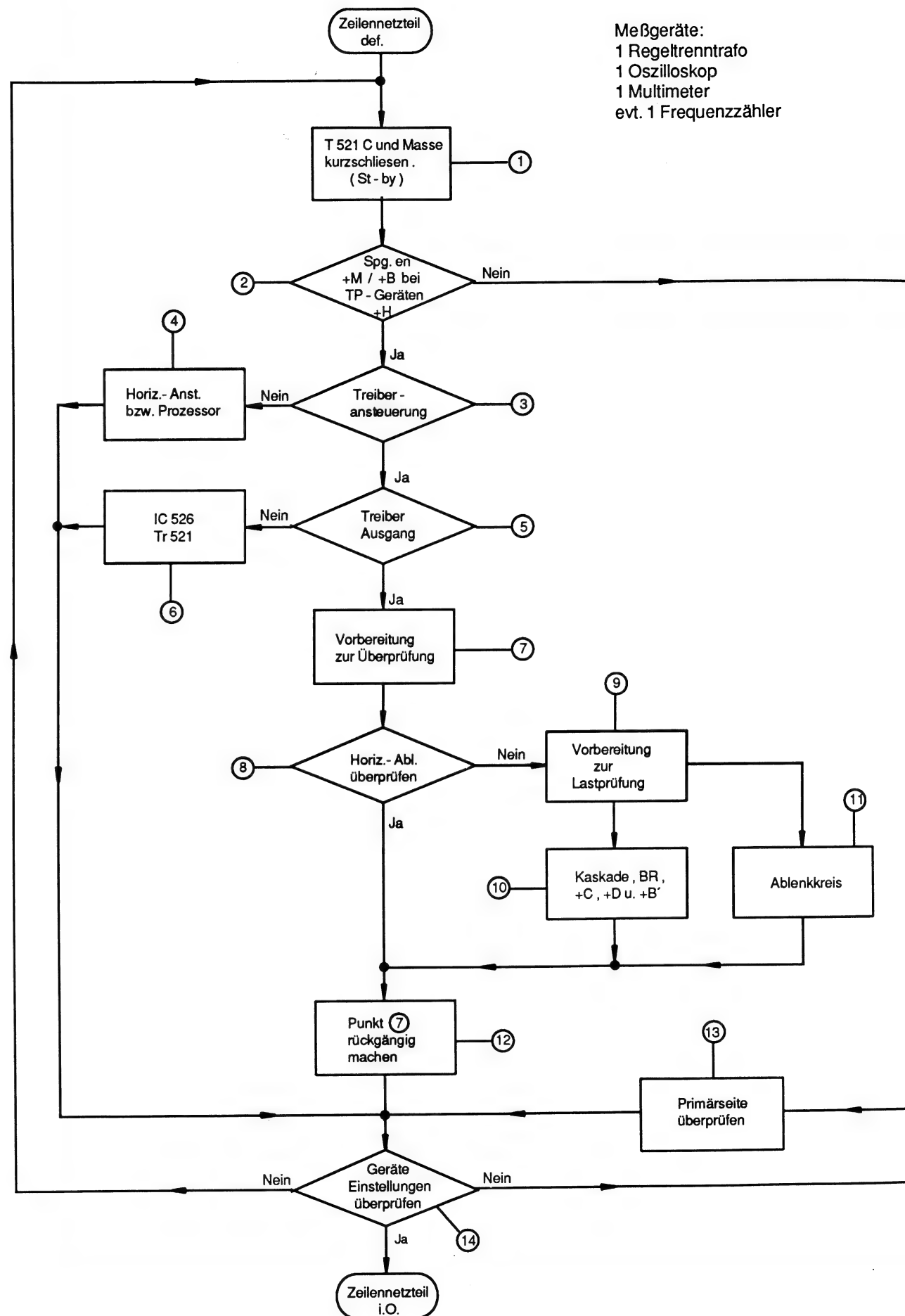
- zu kleiner Betriebsspannung an Pin (≤ 7 V)
- zu großem I_{CE} des T 521 (negativer als -1 V an Pin 7)
- Netzüberspannung (Spannung an Pin 18 um 2,8 V größer als an Pin 2)
- Netzunterspannung (Spannung an Pin 18 um 1,4 V < als an Pin 2)
- zu großer Hochspannung (Zeilenrückschlagimpulse ≥ 6 V an Pin 12)
- überhöhter Kristalltemperatur (>135°C).

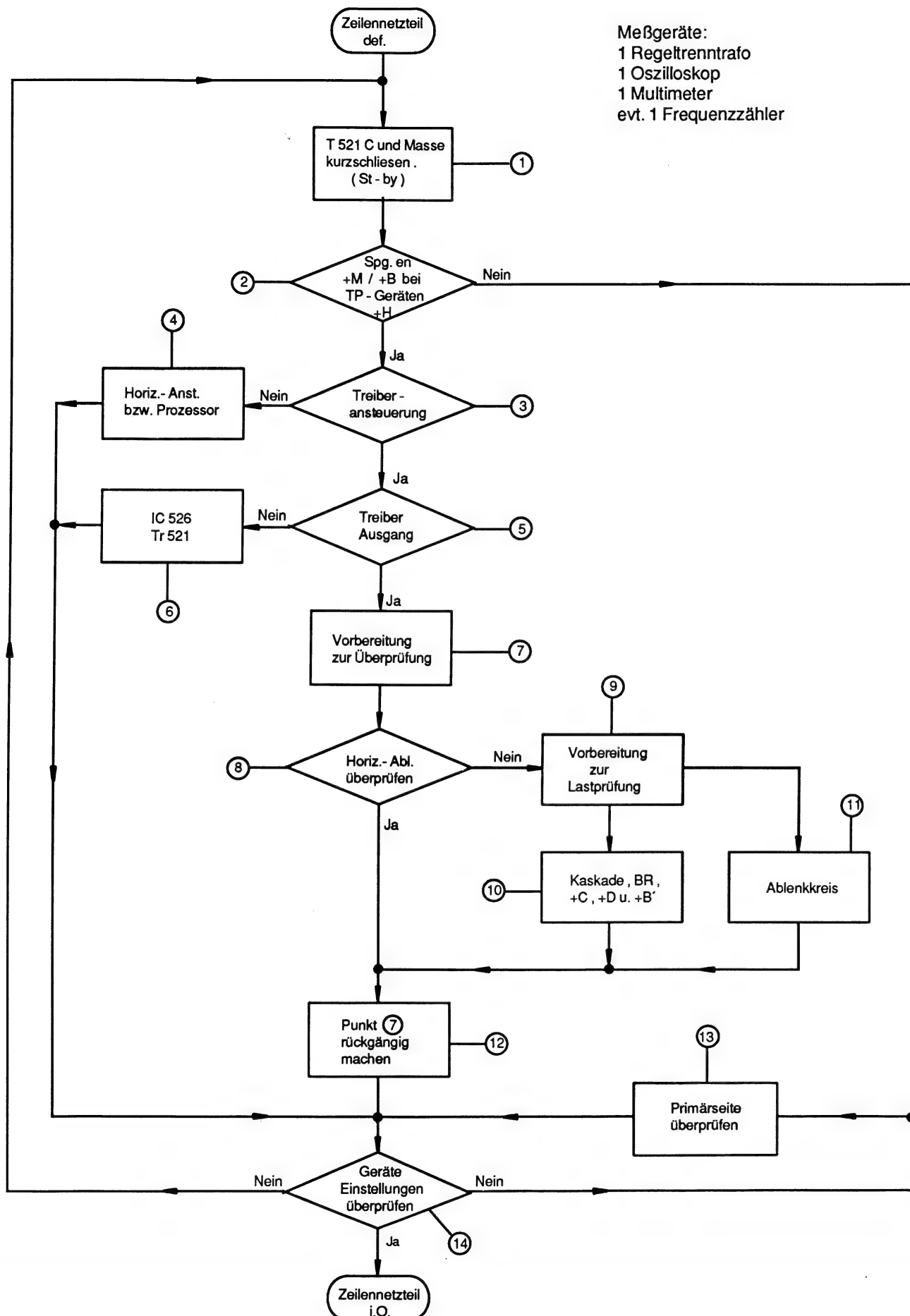
Schutzschaltungen des TDA 8140.

Es erfolgt sofortige Abschaltung bei:

- zu geringer Betriebsspannung an Pin 2 (< 7 V)
- Störimpulsen (falsche Steuerimpulse) während des Zeilenrücklaufes
- überhöhter Kristalltemperatur (> 160°).

Tips zur Fehlersuche im Zeilennetzteil



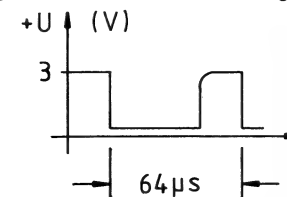


Erklärung zu den einzelnen Schritten im Flußdiagramm:

- ① Netzstecker ziehen
H - Ablenkanaltransistor T 521 Kollektor mit Masse verbinden (Stand by)

- ② Gerät einschalten
Sekund. Spannung messen: +M 10-12,5 V (I_{max} 350 mA)
+B 9-11 V
+H 5 V (nur bei TP)

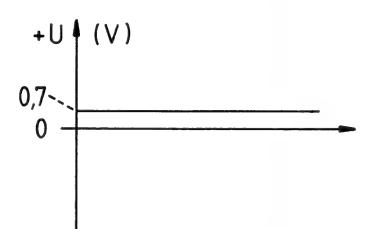
- ③ TDA 8140 Oszillogramm Pin 7 15625 Hz



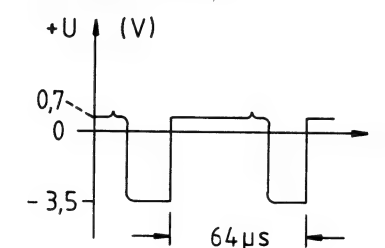
Spannung Pin 2 8-12 V
Spannung Pin 6 > 2,5 V = Normalbetrieb
Spannung Pin 6 0 V = Stand by (TP)

- ④ Ablenk-Baustein (CUC 3510) bzw. ZF/Synch.-Baustein:
Hor. Ausgang testen
Bedienteil - Prozessor: Stand by - Ausgang überprüfen.

- ⑤ Basis T 521 Oszillogramm:
bei IC 525 Pin 6: 0 V



bei IC 526 Pin 6: > 2,5 V



- ⑥ TDA 8140 mit Außenbeschaltung und T 521 überprüfen.

- ⑦ Vorbereitung zur Überprüfung der Horizontal-Endstufe
- Netzstecker ziehen, Si 624 entfernen
- Anschluß \diamond am Zeilennetztrafo TR 665 auftrennen
- Tr 521 Kurzschluß entfernen

- Eine Gleichspannung 12 - 20 V über eine Diode (Katode an D 691 / Katode) zur Entkopplung an + M einspeisen.
- Gerät über Tele - Pilot einschalten
- An TR 665 Anschluß \diamond eine Gleichspannung von ca. 130 V (ca. 450 mA) einspeisen. Hierzu kann auch das eigene Netzteil verwendet werden: Elko C 626 Masse mit Sekundär - Masse und Elko + mit Anschluß \diamond TR 665 verbinden. Regeltrenntrafo einschalten und auf 0V stellen. Netzstecker des Gerätes am RT einstecken. Gerät über Netztaete einschalten und RT auf 100 V~ stellen.

- ⑧ Bei richtiger +C Spannung erscheint ein zu großes Bild. Wenn das eigene Netzteil verwendet wird ist es zusätzlich verbrummt. Die extern eingespeiste Niedervoltspannung kann jetzt abgeschaltet werden. Das Gerät versorgt sich selbst.

- Achtung:** Das Gerät jetzt nicht mehr mit dem Tele - Pilot auf Stand by schalten, sondern über Netztaete ausschalten oder Hochvoltspannung abschalten. Bei Neustart immer erst die Niedervoltspannung anlegen und mit Tele - Pilot einschalten.

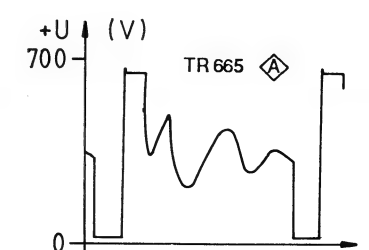
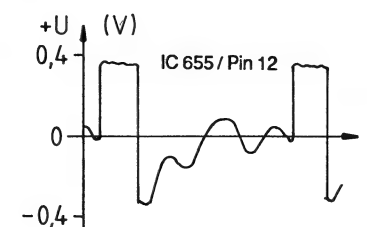
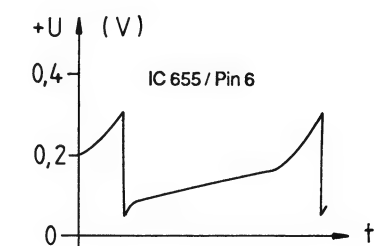
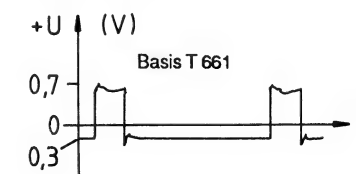
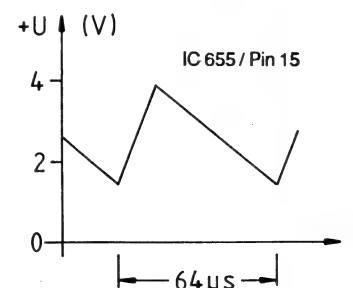
- ⑨ Vorbereitung zur Lastprüfung
Netzstecker ziehen, eventuell angelegte externe Hochvoltspannung (120 V) an TR 665/Anschluß \diamond abschalten.

- ⑩ Kaskade U~ ablöten (Test: Kaskade und Bildröhre)
Last an Sekundär-Spannungsquellen prüfen:
Ohmmessung zwischen Masse und den Punkten +C, +D, +B, +B', +M, +H.
Der gemessene Widerstandswert muß bei richtiger Polung (Gleichrichterdiode in Sperrichtung) größer als 4k Ω sein.

- ⑪ Tr 521 und Ablenkkreis (Horiz. Joch 1,5-3,5 Ω) prüfen

- ⑫ Alle Punkte unter rückgängig machen

- ⑬ TR 665 Spannung Pkt. \diamond ca. 300 V
TDA 3640 Spannung Pin 18 ca. 13 V, Spannung Pin 17 ca. 6 V
Pin 2 ca. 10,5 V, Spannung Pin 16 ca. 3 V

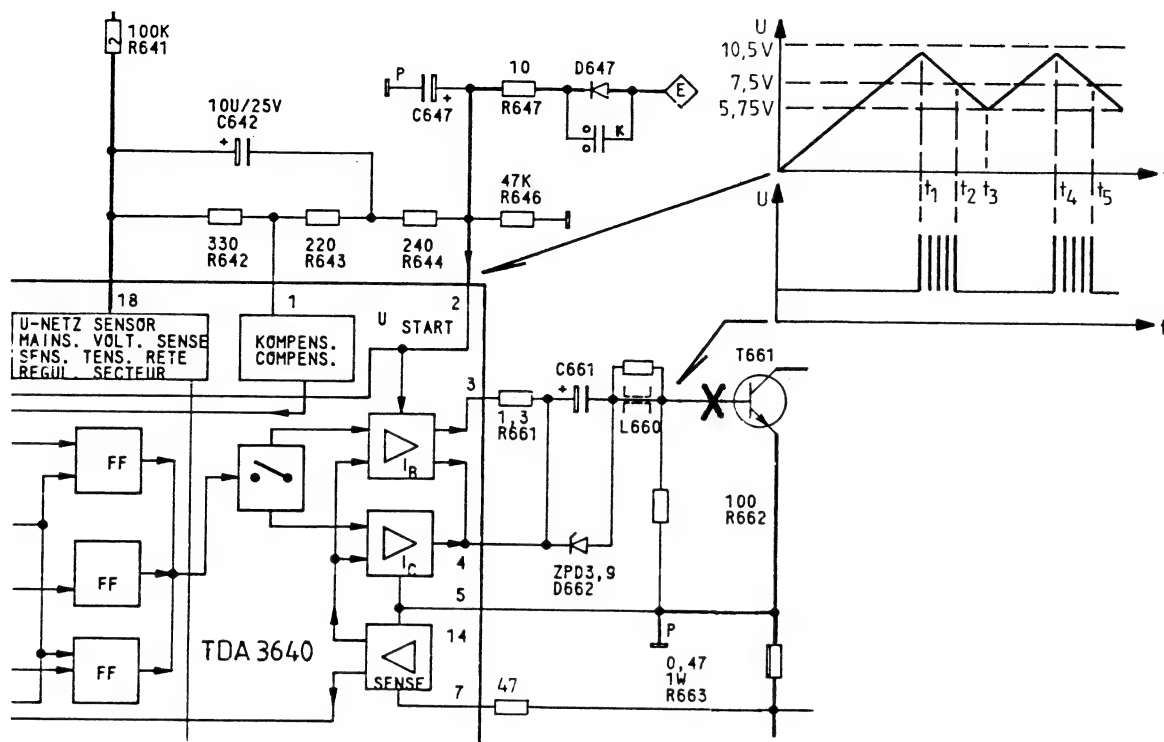


Mögliche Fehlerursachen: Si 624, T. 661, D 666, R 647, TDA 3640. Kurzschluß T 521 entfernen.

Einfacher Test für den Anschwing-Ablauf

Der Anschwing-Ablauf kann ohne Netzschalttransistor T 661 geprüft werden.

Hierzu den Basis-Anschluß T 661 von der übrigen Schaltung trennen:



Oszilloskop anschließen (Pin 2/C 661). Gerät einschalten.

An IC/Pin 2 steigt die Anlaufspannung bis knapp unter die Regelgröße 10 V an (Zeitpunkt t_1), Stromaufnahme ca. 100 μ A.

Zeitpunkt t_1 : IC 655 schwingt an (Stromaufnahme 15-20 mA) und gibt über Pin 3 etwa zeilenfrequente Steuerimpulse ab (ca. 1,5 V_{ss}). Der Spannungsteiler R 642, R 643 und R 644 ist für den IC-Betrieb (20 mA) zu hochohmig. Über D 647 wird keine Betriebsspannung gewonnen. An Pin 2 sinkt die Spannung wieder ab.

Zeitpunkt t_2 : Bei U_B 7,0 V schaltet IC 655 die Basis-Ansteuerung ab. U_B sinkt weiter.

Zeitpunkt t_3 : Bei U_B 5,75 V schaltet IC 655 ab, Stromaufnahme nur noch ca. 100 μ A. U_B steigt wieder an und im Zeitpunkt t_4 beginnt der Zyklus erneut.

Am IC/Pin 15 ist das ständige Anschwingen und Abschalten durch Impulspakete erkennbar.

⑭ +C Spannung nach Schaltbild kontrollieren, ggf. an R 637 nachstellen, Netzregelung mit Regeltrafo testen ($\pm 10\%$).

Short Functional Description

The GRUNDIG line/power supply unit has two important features:

- the line/mains transformer (ZNT) with ferrite core. This transformer is provided with windings for the power supply and line output stages;
- the supply frequency corresponds to the line frequency.

The ZNT is used for electrical isolation, horizontal deflection, and generation of the operating voltage. The ZNT windings are tightly and loosely coupled to ensure that the load capacity of the supplies is high enough and that back effects on the line transformer winding N-M are avoided.

Startup Circuit

The starting voltage for IC 655 is obtained from the bridge rectifier D 621 via R 641. If the voltage on pin 2, which is derived from the resistor network R 642, 643, and 644, reaches a level of approximately 10 V, the IC 655 starts to drive T 661 via pin 3 (precondition: pin 18 > 10V). The line/power supply circuit starts to oscillate. Simultaneously, the current consumption drawn via pin 2 rises and the winding E-D of the ZNT takes over the operating voltage supply function (D 647, R 647, C 647).

Oscillator in IC TDA 3640

The control pulses for the T 661 are generated by an oscillator which operates on the threshold principle where C 653 is an externally connected frequency-determining component (oscillator retaining range 14-17 kHz approx.). The oscillator oscillates at a free-running frequency until the reference pulses from the ZNT exceed 1 V_p at pin 12. In full operating condition (ON) a voltage of about +5 V_p is applied to pin 12.

Line Output Stage

The deflection transistor T 521 is activated in stand-by mode. The cyclic line-frequency control of the deflection transistor corresponds to the "ON" operating mode. The power for the horizontal sweep circuit is derived from the electromagnetic force of coil M-N so that no additional operating voltage is necessary for T 521.

Voltage Stabilisation

In stand-by mode the pulse from winding E-D (tightly coupled with winding A-B) is used as a reference for stabilisation. The controlled variable is +10.5 V on pin 2 TDA 3640.

In full operating condition, that is "ON", the voltage in the horizontal sweep circuit (transformer winding M-N) must be stabilised to a constant level. This is achieved by means of a reference pulse from winding C-D which is tightly coupled with winding M-N. The resulting direct voltage obtained via D 633 is proportional to the width of the picture or high voltage and is applied to pin 10 and compared with the reference voltage (about 3 V) on pin 11. In this part of the circuit the +C voltage is adjusted by means of R 637 to 196 V and 192 V for 25" receivers and 28" receivers, respectively.

Protective Circuits of TDA 3640

The protective circuits respond immediately if:

- the operating voltage on pin 2 is too low (≤ 7 V);
- I_{CE} of T 521 is too high (more negative than -1 V at pin 7);
- the power supply voltage is too high (voltage at pin 18 is 2.8 V higher than at pin 2);
- the power supply voltage is too low (voltage at pin 18 is 1.4 V lower than at pin 2);
- the high voltage is excessively high (line flyback pulses ≥ 6 V at pin 12);
- the crystal temperature is too high ($> 135^\circ$ C).

Protective Circuits of TDA 8140

The protective circuits respond immediately if:

- the operating voltage at pin 2 is too low (< 7 V);
- interference pulses (incorrect control pulses) occur during line flyback;
- the crystal temperature is too high ($> 160^\circ$ C).

Short Functional Description

The GRUNDIG line/power supply unit has two important features:

- the line/mains transformer (ZNT) with ferrite core. This transformer is provided with windings for the power supply and line output stages;
- the supply frequency corresponds to the line frequency.

The ZNT is used for electrical isolation, horizontal deflection, and generation of the operating voltage. The ZNT windings are tightly and loosely coupled to ensure that the load capacity of the supplies is high enough and that back effects on the line transformer winding N-M are avoided.

Startup Circuit

The starting voltage for IC 655 is obtained from the bridge rectifier D 621 via R 641. If the voltage on pin 2, which is derived from the resistor network R 642, 643, and 644, reaches a level of approximately 10 V, the IC 655 starts to drive T 661 via pin 3 (precondition: pin 18 > 10V). The line/power supply circuit starts to oscillate. Simultaneously, the current consumption drawn via pin 2 rises and the winding E-D of the ZNT takes over the operating voltage supply function (D 647, R 647, C 647).

Oscillator in IC TDA 3640

The control pulses for the T 661 are generated by an oscillator which operates on the threshold principle where C 653 is an externally connected frequency-determining component (oscillator retaining range 14-17 kHz approx.). The oscillator oscillates at a free-running frequency until the reference pulses from the ZNT exceed 1 V_p at pin 12. In full operating condition (ON) a voltage of about +5 V_p is applied to pin 12.

Line Output Stage

The deflection transistor T 521 is activated in stand-by mode. The cyclic line-frequency control of the deflection transistor corresponds to the "ON" operating mode. The power for the horizontal sweep circuit is derived from the electromagnetic force of coil M-N so that no additional operating voltage is necessary for T 521.

Voltage Stabilisation

In stand-by mode the pulse from winding E-D (tightly coupled with winding A-B) is used as a reference for stabilisation. The controlled variable is +10.5 V on pin 2 TDA 3640.

In full operating condition, that is "ON", the voltage in the horizontal sweep circuit (transformer winding M-N) must be stabilised to a constant level. This is achieved by means of a reference pulse from winding C-D which is tightly coupled with winding M-N. The resulting direct voltage obtained via D 633 is proportional to the width of the picture or high voltage and is applied to pin 10 and compared with the reference voltage (about 3 V) on pin 11. In this part of the circuit the +C voltage is adjusted by means of R 637 to 196 V and 192 V for 25" receivers and 28" receivers, respectively.

Protective Circuits of TDA 3640

The protective circuits respond immediately if:

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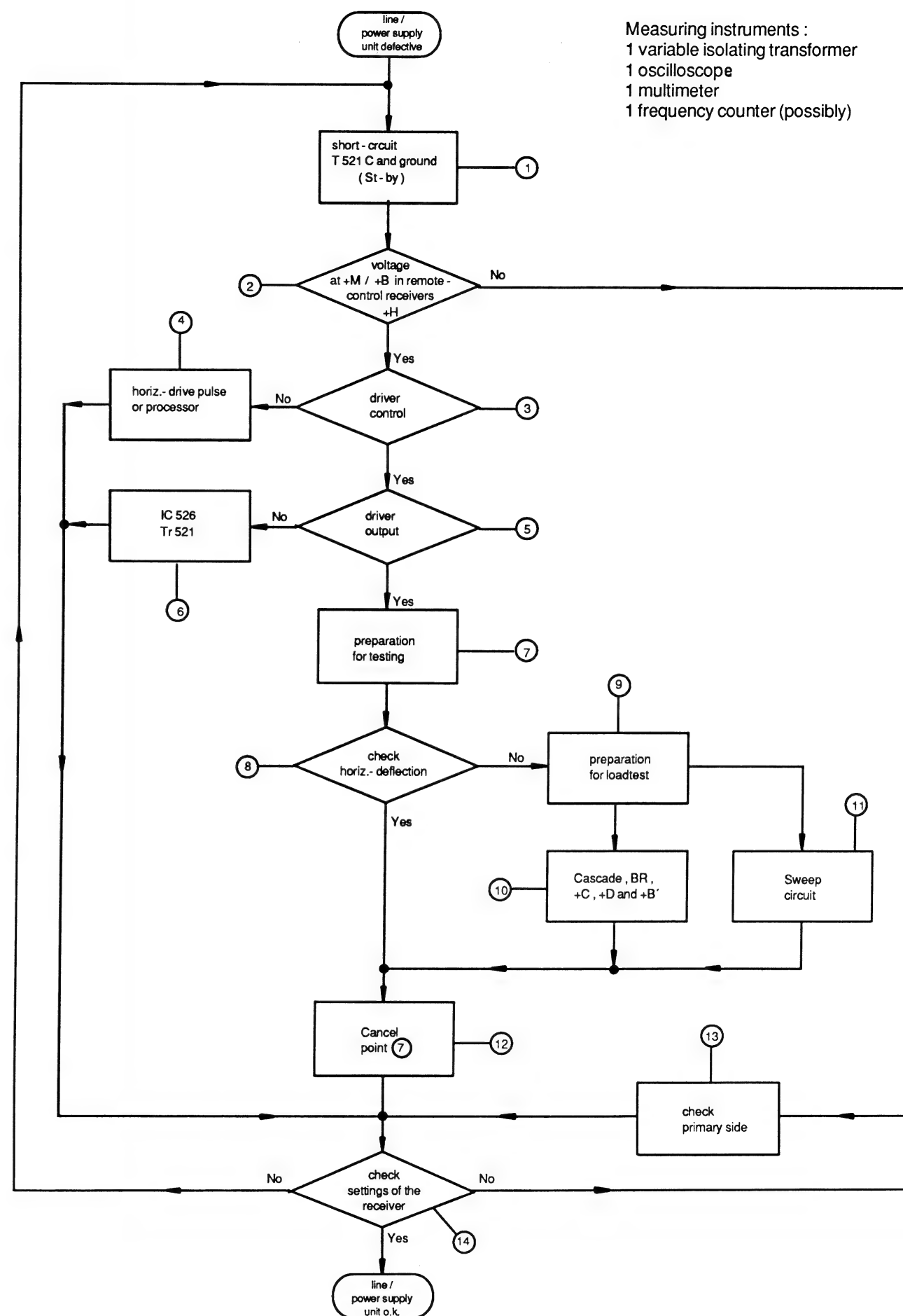
Protective Circuits of TDA 8140

The protective circuits respond immediately if:

- the operating voltage at pin 2 is too low (< 7 V);
- interference pulses (incorrect control pulses) occur during line flyback;
- the crystal temperature is too high ($> 160^\circ$ C).

Hints for Fault Finding in the Line/Power Supply Unit

Measuring instruments :
1 variable isolating transformer
1 oscilloscope
1 multimeter
1 frequency counter (possibly)

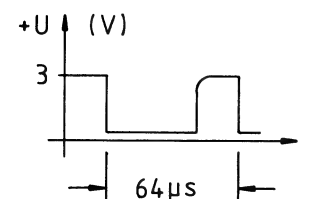


Explanation of the individual steps in the flow chart:

- ① Disconnect the mains plug
Connect the horizontal sweep transistor T 521 collector to ground (stand-by)
- ② Switch on the receiver.
Check the secondary voltages:

+M 10-12.5 V (I_{max} 350 mA)
+B 9-11 V
+H 5 V (only RC receivers)
pin 715625 Hz

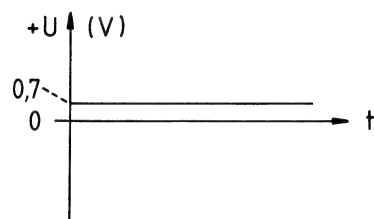
- ③ TDA 8140 oscillogram



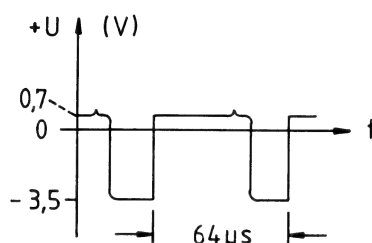
voltage
voltage
voltage
pin 2 8-12 V
pin 6 > 2.5 V = normal operation
pin 6 0 V = stand-by (RC)

- ④ Deflection module (CUC 3510) and IF/sync module: check line output Control unit - processor: check stand-by - output

- ⑤ Oscillogram of base T 521
IC 526 pin 6: 0 V



IC 526 pin 6: > 2.5 V



- ⑥ Check TDA 8140 with externally connected components and T 521

- ⑦ Preparations for checking the line output stage

- Disconnect the mains plug; remove Si 624
- Open connection \diamond of the line/mains transformer TR 665
- Remove the short circuit from T 521
- For decoupling apply a direct voltage of 12 - 20 V to contact +M via a diode (cathode to cathode of D 691).
- Switch on the receiver by means of the remote control (Telepilot).
- On contact \diamond of TR 665 feed in a direct voltage of about 130 V (approx. 450 mA). When using the built-in power supply: Connect the (626 electrolyte capacitor ground to the secondary ground and the anode of the capacitor to contact \diamond of TR 665. Switch on the voltage regulating transformer (RT) and set it to OV. Connect the mains plug of the receiver to RT. Push the power button on the receiver and set RT to 100 VAC.

- ⑧ If the +C voltage is correct the picture is too large. Additionally, an intensive mains hum will be visible when using the built-in power supply. The externally fed in low potential may now be switched off. The receiver operates on its own supply.

Warning! Do not use the remote control to switch the receiver to standby again. Use the power switch or switch off the EHT, instead. When restarting always apply the low potential first and switch on the receiver with the remote control.

- ⑨ Preparations for load test

Disconnect the mains plug and switch off the external high voltage (120 V) possibly connected to TR 665/contact \diamond .

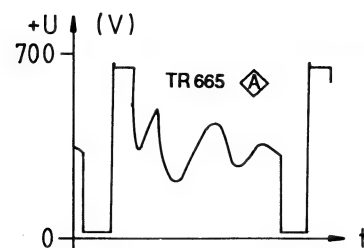
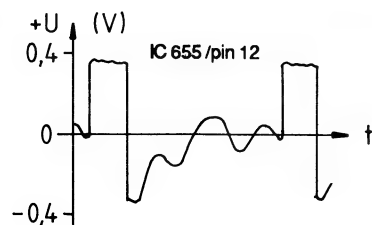
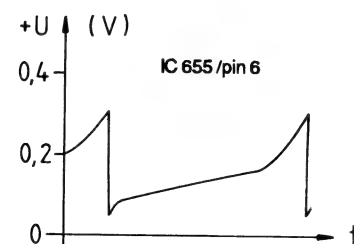
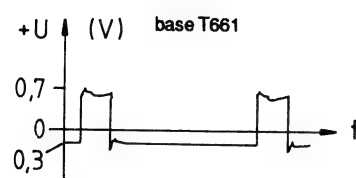
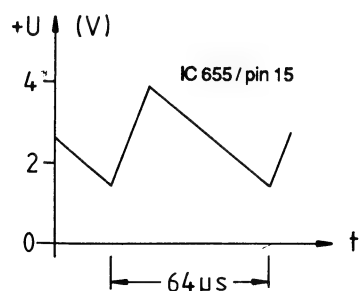
- ⑩ Unsolder cascade U a.c. (cascade and picture tube test)

Check the load at the secondary voltage sources:
Ohmic resistance between ground and points +C, +D, +B, +B', +M, +H. If the polarity is correct (rectifier diode in high-resistance direction) the measured resistance must be higher than 4 kOhm.

- ⑪ Check T 521 and sweep circuit (horizontal deflection yoke 1.5-3.5 Ohm)

- ⑫ Cancel all preparatory measures under ⑦.

- ⑬ TR 665 voltage point \diamond 300 V approx.
TDA 3640 voltage pin 18 13 V approx., voltage pin 17 6 V approx.
voltage pin 2 10.5 V approx., voltage pin 16 3 V approx.



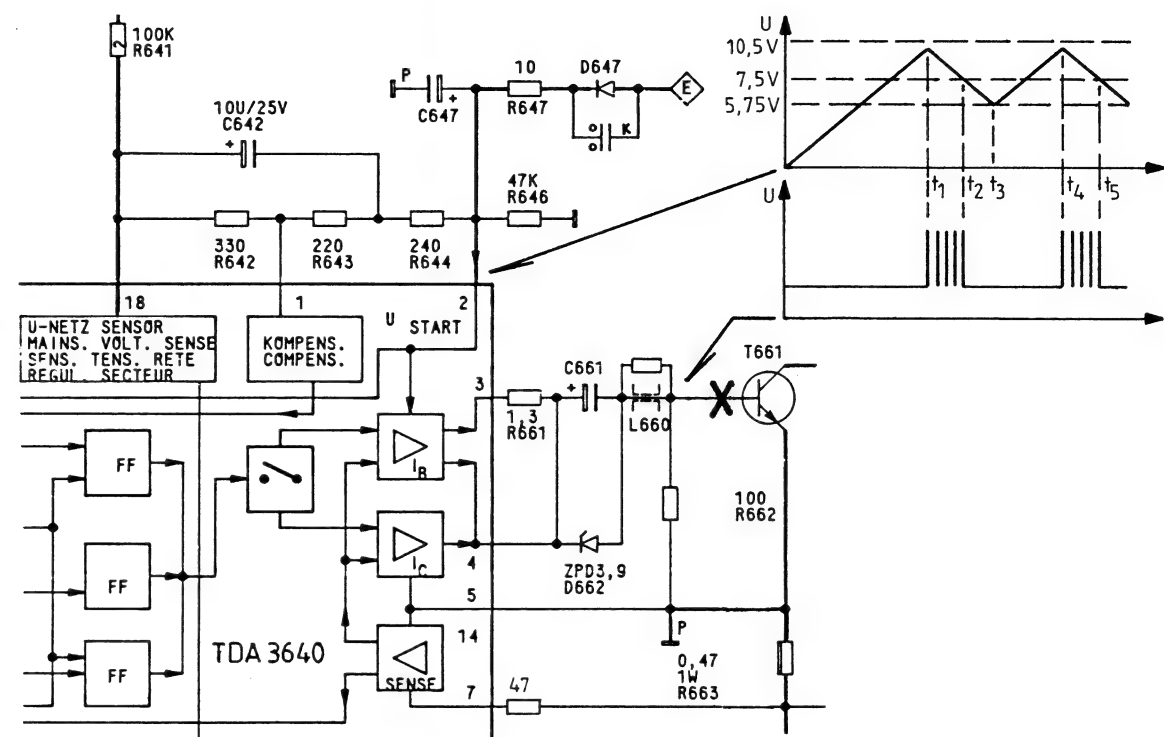
Possible causes of trouble: Si 624, T 661, D 666, R 647, TDA 3640.

Remove short circuit at T 521.

Simplified Test for the Startup Sequence

The startup sequence can be checked without the mains switching transistor T 661.

For this purpose, disconnect the base of T 661 from the circuit:



Connect an oscilloscope to pin 2/C 661. Switch on the receiver. On pin 2 of the IC the starting voltage must rise to just below the controlled variable of 10 V (time t_1); current consumption approx. 100 μ A.

Time t_1 : IC 655 starts to oscillate (current consumption 15-20 mA) and supplies via pin 3 control pulses at approx. line frequency ($1.5 V_{pp}$). The voltage divider R 642, R 643, and R 644, is at too high a resistance to provide sufficient current for the IC to be in operation (20 mA required). There is no operating voltage obtained via D 647. The voltage at pin 2 decreases.

Time t_2 : When the voltage U_B reaches 7.0 V the IC 655 stops driving the base. U_B continues to decrease.

Time t_3 : When the voltage U_B reaches 5.75 V the IC 655 switches off; the current consumption is now only 100 μ A approximately. U_B rises and the cycle starts again at t_1 .

On pin 15 of the IC the cyclic oscillation and switching off process can be identified by the packets of pulses.

- ⑭ Check the voltage +C according to the circuit diagram and readjust it with R 637, if necessary; check the power supply voltage regulation with the variable-voltage transformer ($\pm 10\%$).

Prospetto delle

L'alimentatore GRUND

- il trasformatore di ri

- la frequenza dell'ali

Il trasformatore serve p

mento stretto e lasco d

sultano effetti reattivi s

Il circuito di spunto

La tensione di spunto d

ottengono ca. 10 V al p

atore di riga entra in re

tore provvede ad otten

L'oscillatore in IC TDA 36

Gli impulsi di comando

che determina la frequ

regime libero finchè gli

ca. +5 V_p.

Lo stadio finale di riga

In funzionamento stand

sponde alla condizione

T 521 non necessita di n

La stabilizzazione della te

In stand-by l'impulso de

zione. Al pin 2 di IC TDA

Con apparecchio acces

viene mediante l'impul

tenuta con D 633 è prop

al pin 11 (ca. 3 V). In qu

apparecchi da 28".

Circuiti di protezione del

Essi provocano un imm

- quando al pin 2 la te

- quando esiste ecces

- in presenza di sovra

- in presenza di sottot

- quando la EAT è ecc

- con eccessiva temp

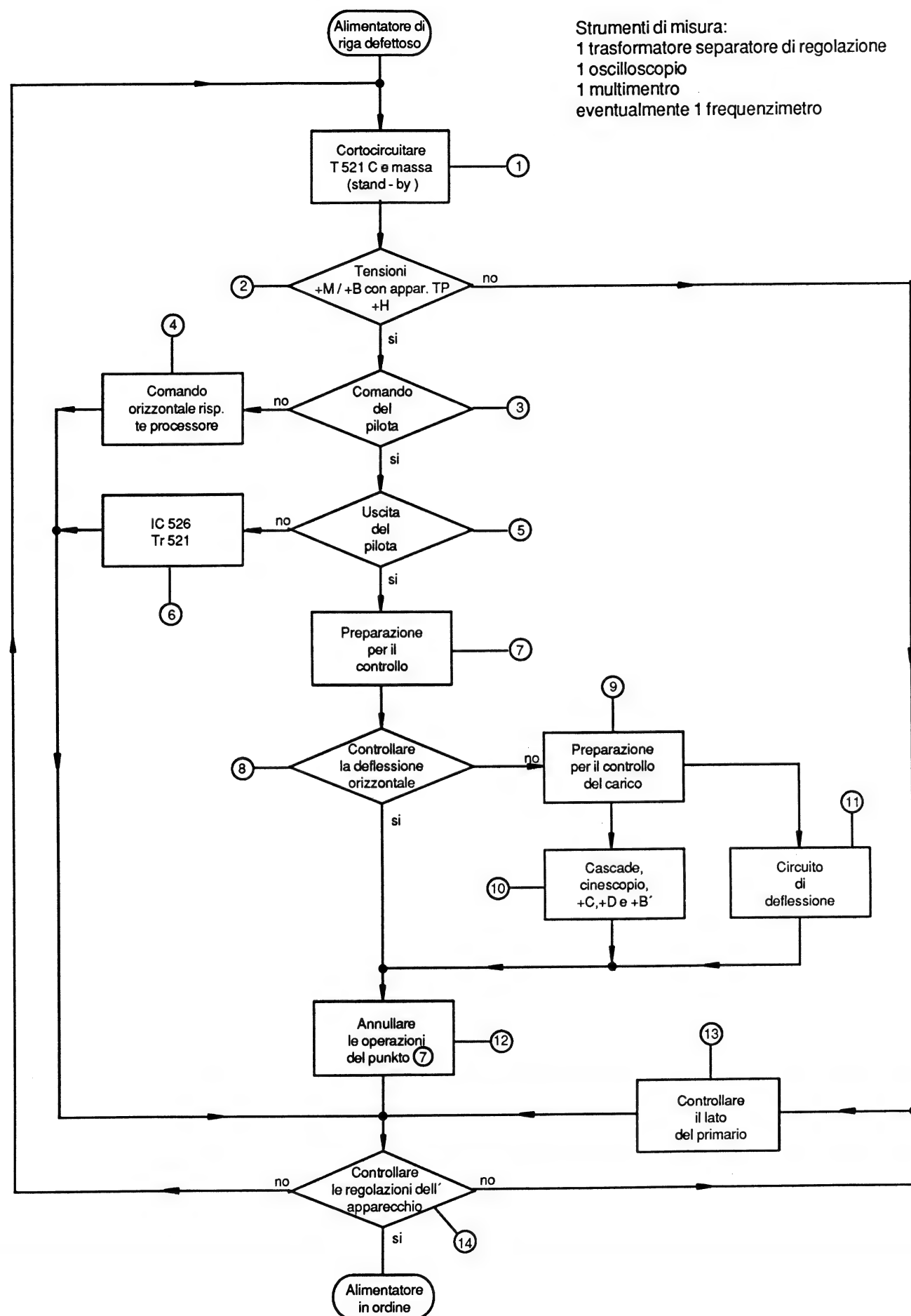
Circuit di protezione del T

Essi provocano un imm

- quando al pin 2 la te

- in presenza di impul

- con eccessiva temp



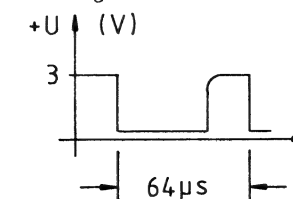
Spiegazione dei singoli passaggi del diagramma di ricerca:

- ① Disinserire la spina di rete.
 Collegare a massa il collettore del transistor di deflessione orizzontale T 521 (stand-by).

- ② Accendere l'apparecchio
 Misurare la tensione secondaria:
 +M 10-12,5 V (I_{max} 350 mA)
 +B 9-11 V
 +H 5 V (solo app. con TP)

- ③ TDA 8140

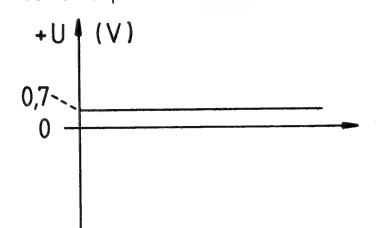
Oscillogramma Pin 7 15625 Hz



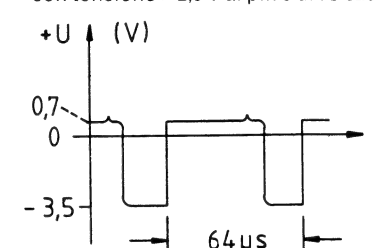
Tensione Pin 2 8-12V
 Tensione Pin 6 > 2,5 V = funz. normale
 Tensione Pin 6 0V = stand-by (TP)

- ④ Modulo di deflessione (CUC 3510) risp. te modulo FI/sincronismo: controllare l'uscita orizzontale.
 Modulo di comando - processore: controllare l'uscita stand-by.

- ⑤ Oscillogramma alla base T 521:
 con 0V al pin 6 di IC 526



con tensione > 2,5 V al pin 6 di IC 526



- ⑥ Controllare TDA 8140 con cablaggio periferico e T 521.

- ⑦ Preparazione per il controllo dello stadio finale orizzontale

- Disinserire la spina di rete, togliere Si 624.
- Staccare il collegamento \diamond sul trasformatore TR 665.
- Allontanare il cortocircuito a TR 521.
- Applicare 12 - 20 V continui mediante un diodo per il disaccoppiamento a +M (catodo al catodo del D 691).
- Accendere l'apparecchio con tp.
- Applicare al collegamento \diamond di TR 665 una tensione continua di 130 V (ca. 450 mA). Per questo può essere impiegato anche l'alimentatore proprio: collegare la massa di C 626 alla massa secondaria e il + al collegamento \diamond trasformatore TR 665. Accendere il trasformatore separatore e portalo su OV. Inserire la spina di rete dell'apparecchio trasformatore separatore. Accendere l'apparecchio mediante il tasto di rete e portare il trasformatore su 100V~.

- ⑧ Con tensione +C corretta, appare un'immagine troppo grande. Quando viene impiegato l'alimentatore proprio, è visibile un ronzio di rete. La tensione di alimentazione esterna a basso voltaggio può ora essere tolta. La apparecchiatura si alimenta da sola. Attenzione: Ora non commutare l'apparecchio su stand-by con telecomando, bensì spegnerlo mediante il tasto di rete oppure togliere la tensione ad alto voltaggio. Per riaccenderlo, applicare innanzitutto sempre la tensione a basso voltaggio ed accendere con telecomando.

- ⑨ Preparazione per il controllo del carico
 Disinserire la spina di rete, togliere la tensione di alimentazione esterna (120 V) eventualmente collegata a TR 665/collegamento \diamond .

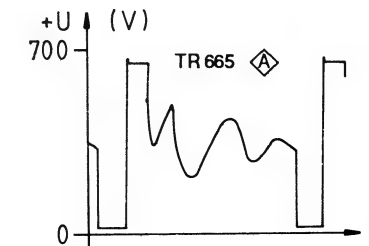
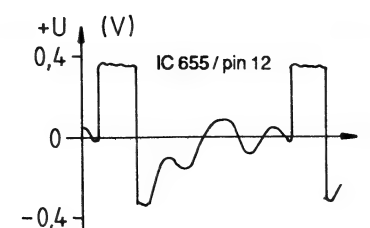
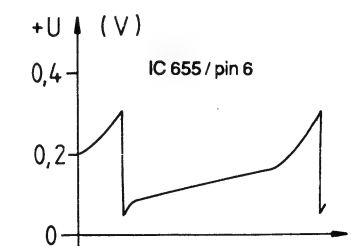
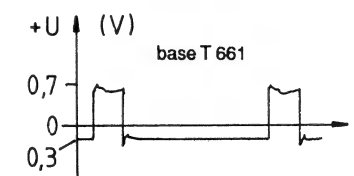
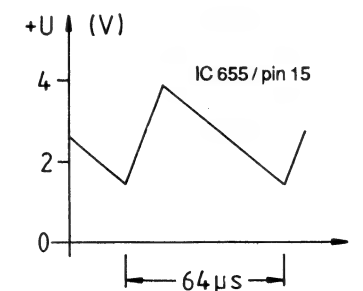
- ⑩ Dissaldare il cascade U~ (controllo del cascade e del cinescopio).

- Controllare il carico alle sorgenti di tensione secondarie:
 Misura ohmica tra massa e i punti +C, +D, +B, +B', +M, +H. Il valore ohmico misurato, con esatta polarità (diodo raddrizzatore con polarizzazione inversa) deve essere superiore a 4 kOhm.

- ⑪ Controllare Tr 521 e il circuito di deflessione (giogo orizzontale 1,5-3,5 Ohm).

- ⑫ Annullare tutte le operazioni descritte al punto 7.

- ⑬ TR 665 tensione punto \diamond ca. 300 V
 TDA 3640 tensione pin 18 ca. 13 V, tensione pin 17 ca. 6 V
 tensione pin 2 ca. 10,5 V, tensione pin 16 ca. 3 V

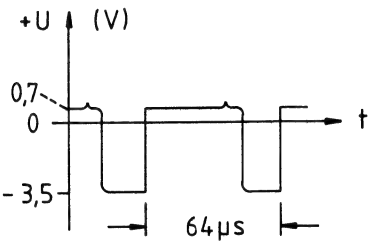


cerca:
flessione orizzontale T 521 (stand-by).

V (I_{max} 350 mA)
V
V (solo app. con TP)
Hz


funz. normale
stand-by (TP)
FI/sincronismo: controllare l'uscita orizzontale.
cita stand-by.

con tensione >2,5 V al pin 6 di IC 526




521.
orizzontale
TR 665.

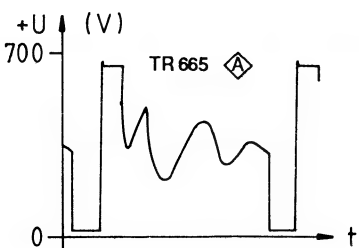
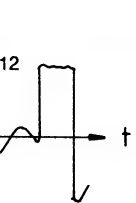
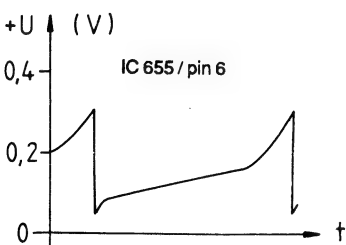
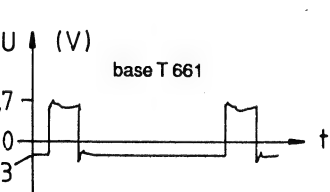
il disaccoppiamento a +M (catodo al catodo del D 691).

ensione continua di 130 V (ca. 450 mA). Per questo può essere impiegato anche
alla massa secondaria e il + al collegamento  trasformatore TR 665. Accendere il
la spina di rete dell'apparecchiotrasformatore séparatore. Accendere l'apparecchio
U 100V~.

ppo grande. Quando viene imegato l'alimentatore proprio, è visibile un ronzio di rete. La
o può ora essere tolta. La apparecchio si alimenta da solo. Attenzione: Ora non
mando, bensì spegnerlo mediante il tasto di rete oppure togliere la tensione ad alto
sempre la tensione a basso voltaggio ed accendere con telecomando.

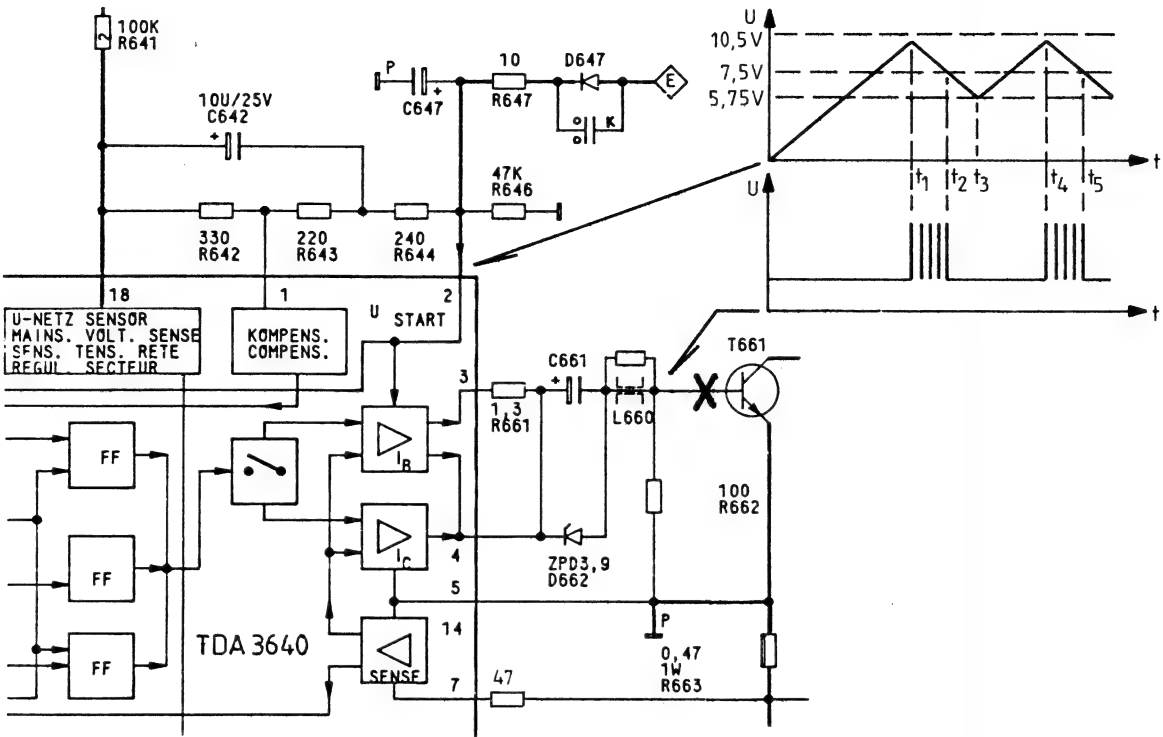
alimentazione esterna (120 V) eventualmente collegata a TR 665/collegamento 
del cinescopio).
ndarie:
+ M, + H. Il valore ohmico misurato, con esatta polarità (diodo raddrizzatore con polarizza-
o orizzontale 1,5-3,5 Ohm).

e pin 17 ca. 6 V
e pin 16 ca. 3 V



Possibili cause del guasto: Si 624, Tr 661, Di 666, R 647, TDA 3640.
Togliere il cortocircuito a Tr 521.

Semplice verifica dell'avviamento processo oscillatorio):
Questo può venir controllato senza il transistor T 661.
Interrompere quindi il collegamento della base di T 661 dal resto del circuito:



Collegare l'oscilloscopio (pin 2/C 661). Accendere l'apparecchio. Al pin 2 dell'integrato la tensione di spunto cresce appena al di sotto della
grandezza di regolazione di 10 V (istante t₁), assorbimento di corrente ca. 100 μA.

Istante t₁: IC 655 oscilla (assorbimento 15-20 mA) e attraverso pin 3 invia impulsi di comando circa alla frequenza di riga (ca. 1,5 V_{pp}).
Il partitore di tensione R 642, R 6432 e R 644 ha un valore ohmico troppo elevato per il funzionamento dell'integrato (20 mA).
Mediante D 647 non viene ricavata nessuna tensione di alimentazione. Al pin 2 la tensione diminuisce nuovamente.

Istante t₂: Con U_B 7,0 V, IC 655 disattiva il circuito di comando della basse. U_B scende ulteriormente.

Istante t₃: Con U_B 5,75 V, IC 655 è disattivato, l'assorbimento è ancora ca. 100 μA. U_B sale nuovamente e all'istante t₄ il ciclo si ripete.

Al pin 15 dell'integrato è riconoscibile il continuo attivarsi e disattivarsi mediante pacchetti di impulsi.

⑬ Controllare la tensione +C secondo lo schema, eventualmente correggerla con R 637, controllare la regolazione della tensione di rete con
il regolatore separatore (±10%).

① Abnehmen und Aufsetzen der Geräte

② Disassembly and assembly of the ca

③ Smontaggio e montaggio dello schie

Symbol auf der Geräterück-
wand beachten!

Please note the symbol at
the rear of the cabinet!

Osservare il simbolo sullo
schienale

Hinweis

Note


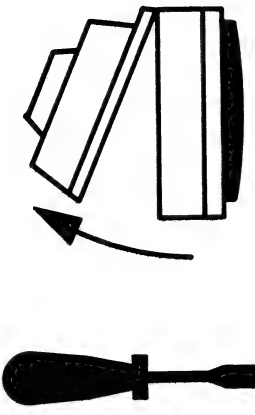
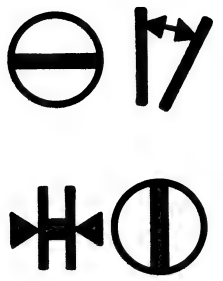
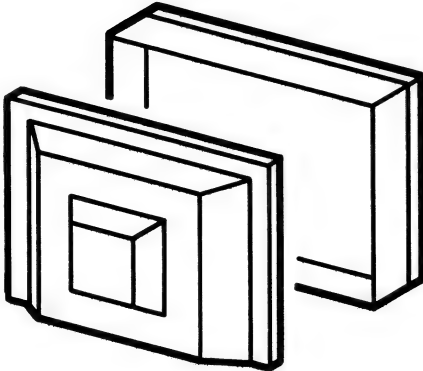
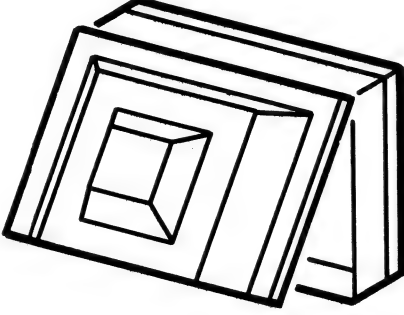
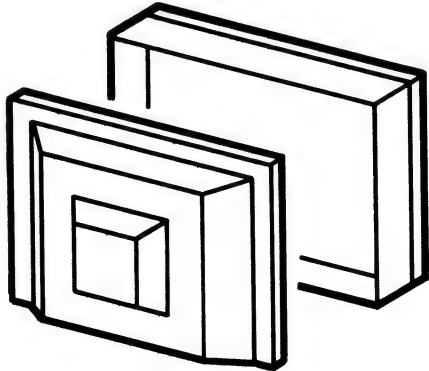
Nota

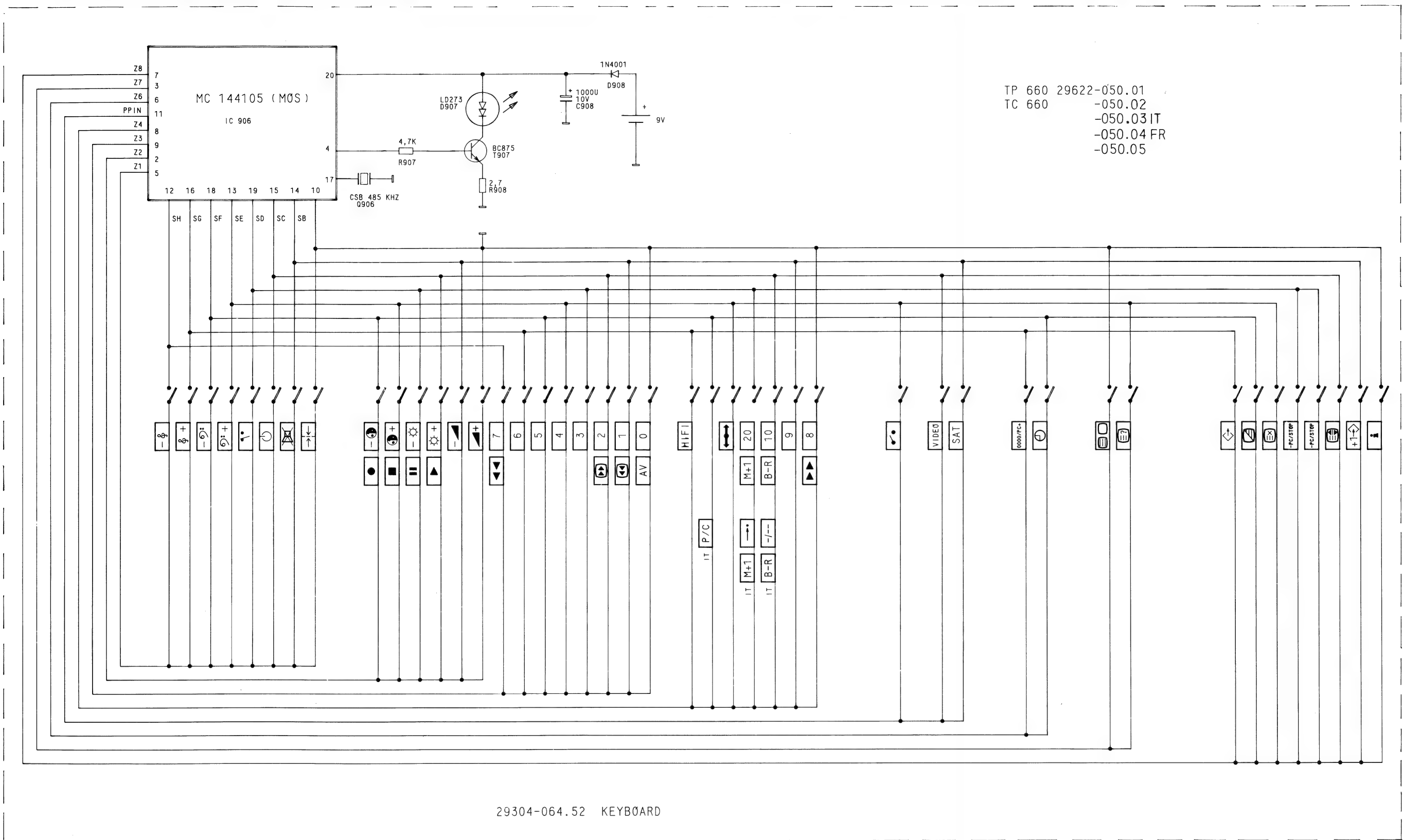
Abnehmen und Aufsetzen
der Geräterückwand

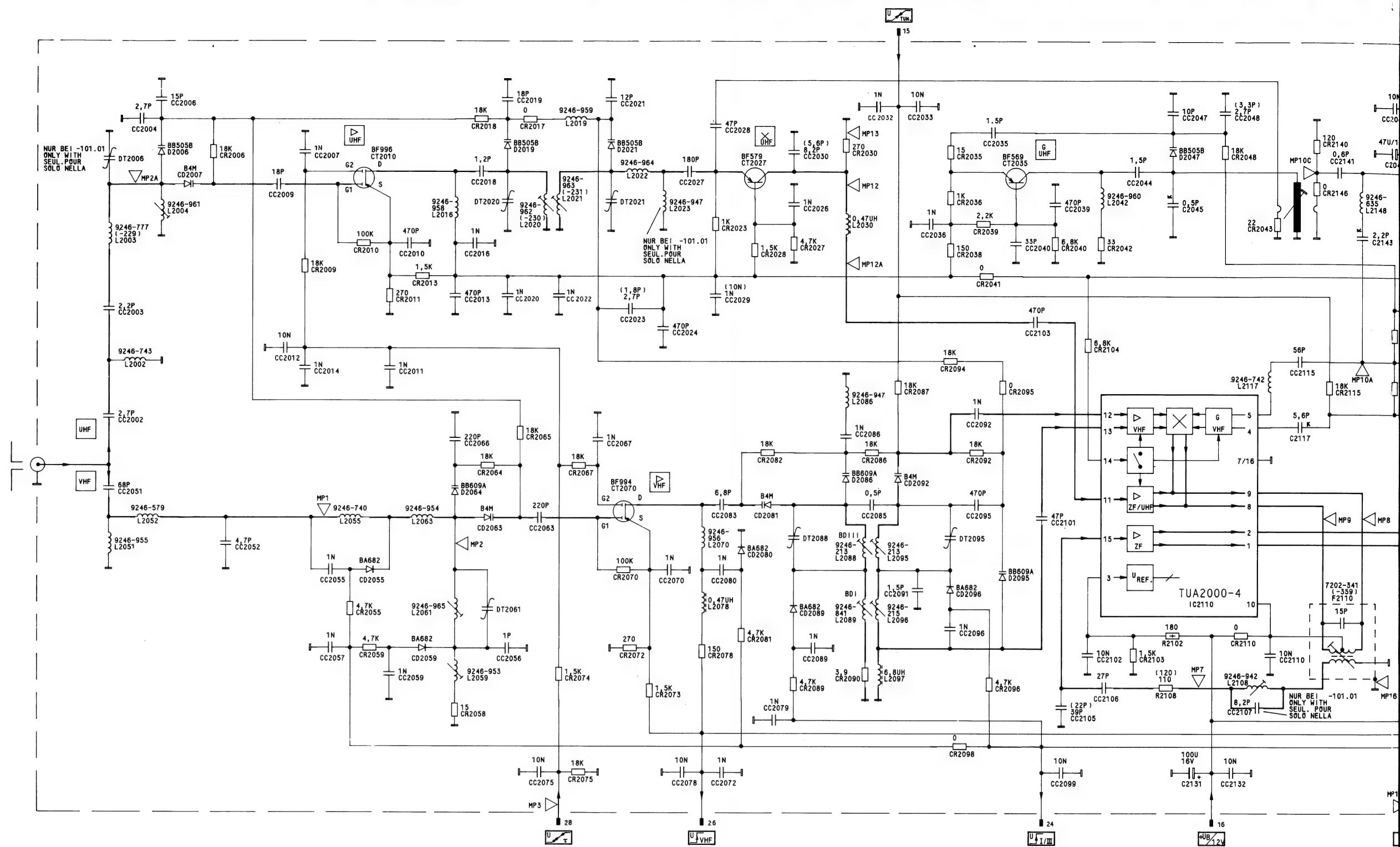
Disassembly and assembly
of the cabinet rear panel

Smontaggio e montaggio
dello schienale

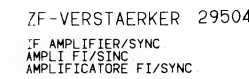
- ① Abnehmen und Aufsetzen der Geräterückwand
- ② Disassembly and assembly of the cabinet rear panel
- ③ Smontaggio e montaggio dello schienale dell'apparecchio

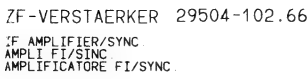
<p>Symbol auf der Geräterückwand beachten!</p> <p>Please note the symbol at the rear of the cabinet!</p> <p>Osservare il simbolo sullo schienale</p>			
<p>Hinweis</p> <p>Note</p> <p>Nota</p>	<p>Schraubendreher (Größe 4) in die markierten Aussparungen stecken. Drücken oder drehen bis der Schnapphaken ausrastet.</p> <p>Insert the screwdriver (size 4) into the marked holes. Press or turn it until the catch disengages.</p> <p>Inserire un giravite (di misura 4) nelle rientranze contrassegnate. Premere o ruotare poi fino a che il gancio a scatto viene a sganciarsi.</p>		<p>Drehen um 90°</p> <p>Turn by 90°</p> <p>Ruotare di 90°</p>
<p>Abnehmen und Aufsetzen der Geräterückwand</p> <p>Disassembly and assembly of the cabinet rear panel</p> <p>Smontaggio e montaggio dello schienale</p>			

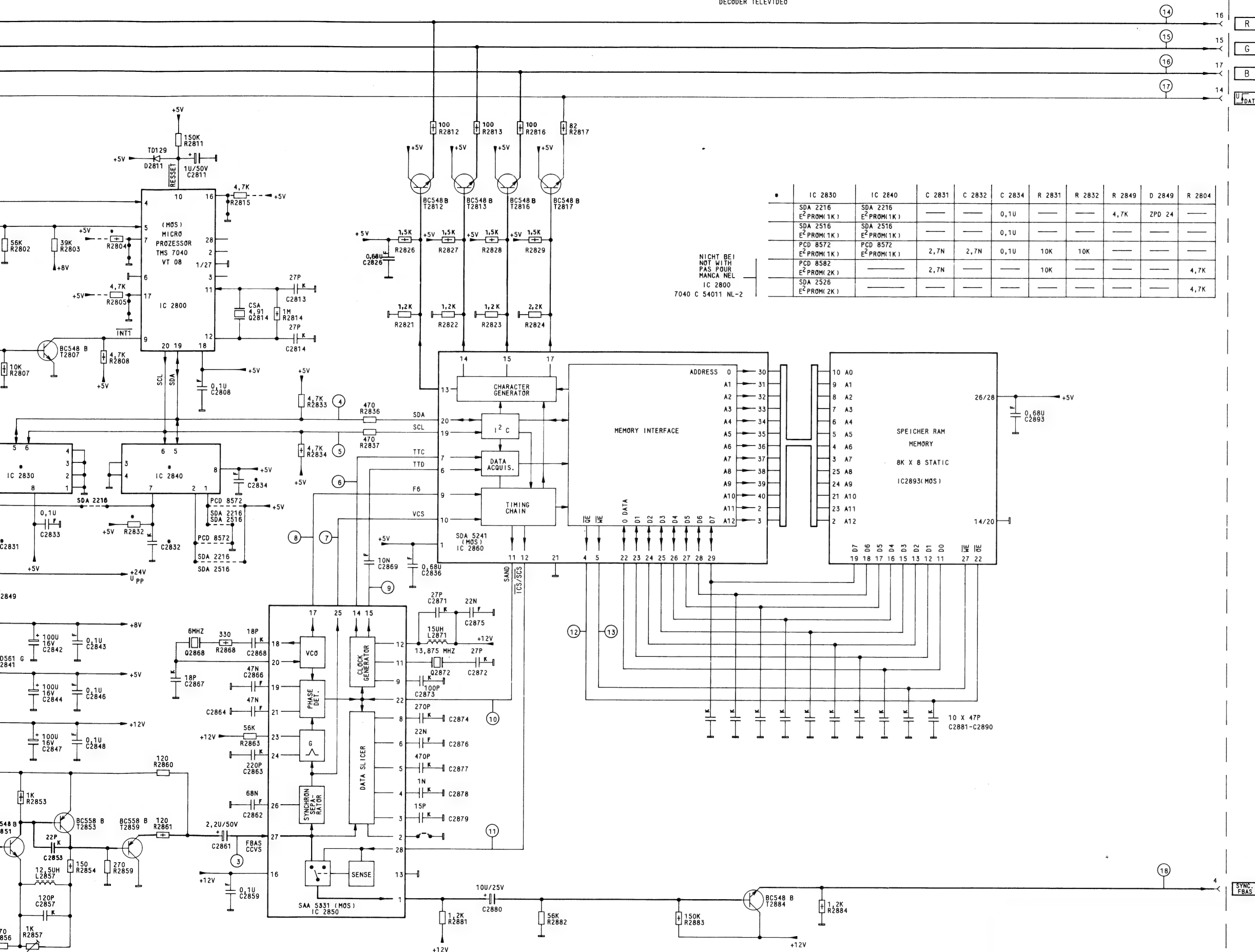




Kein Anpassungsabgleich bei Austausch der Steckkarte notwendig
When replacing the plug-in board, no alignment is necessary
Non è necessaria nessuna taratura di adattamento dopo la
sostituzione di una scheda ad innesto







VT-Nachrüstung und Anpassungsabgleich

Beim Nachrüsten der Videotext-Steckkarte muß die Videotext-Steckerplatte entfernt werden

Der Einsteller R 2857 steht bei Auslieferung auf Linksanschlag (kleinste Höhenanhebung, ca. 2 dB). Treten trotz einwandfreiem Antennensignal Zeichenfehler auf, R 2857 langsam nach rechts verstellen, bis Fehler verschwinden. Nicht weiterdrehen, da Fehlerhäufigkeit wieder zunehmen kann.

Während des Abgleiches ist es notwendig, die Seite 199 ständig neu anzuwählen, da nur so die Seite neu eingelesen wird und eine Beurteilung der Fehlerschwelle möglich ist.

VT (GB: Teletext) instalation and matching adjustment

When fitting the Videotext (GB: Teletext) plug-in board, the Videotext plug plate has to be removed

The control R 2857 is set in the fully anti clockwise position when the unit is delivered (smallest treble boost: approx. 2 dB). If, with a perfect aerial signal character faults occur, turn R 2857 slowly clockwise until the faults disappear. Do not turn R 2857 up any further as error rate may increase again.

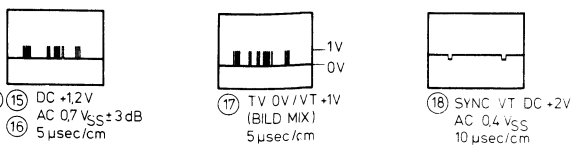
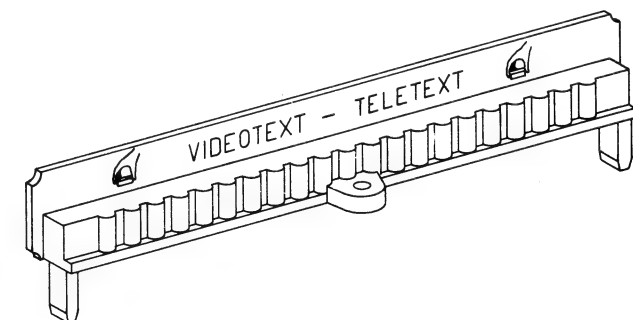
Page 199 must always be selected anew during the adjustment, as only this effects a new read-in of the page making it possible to evaluate the error level.

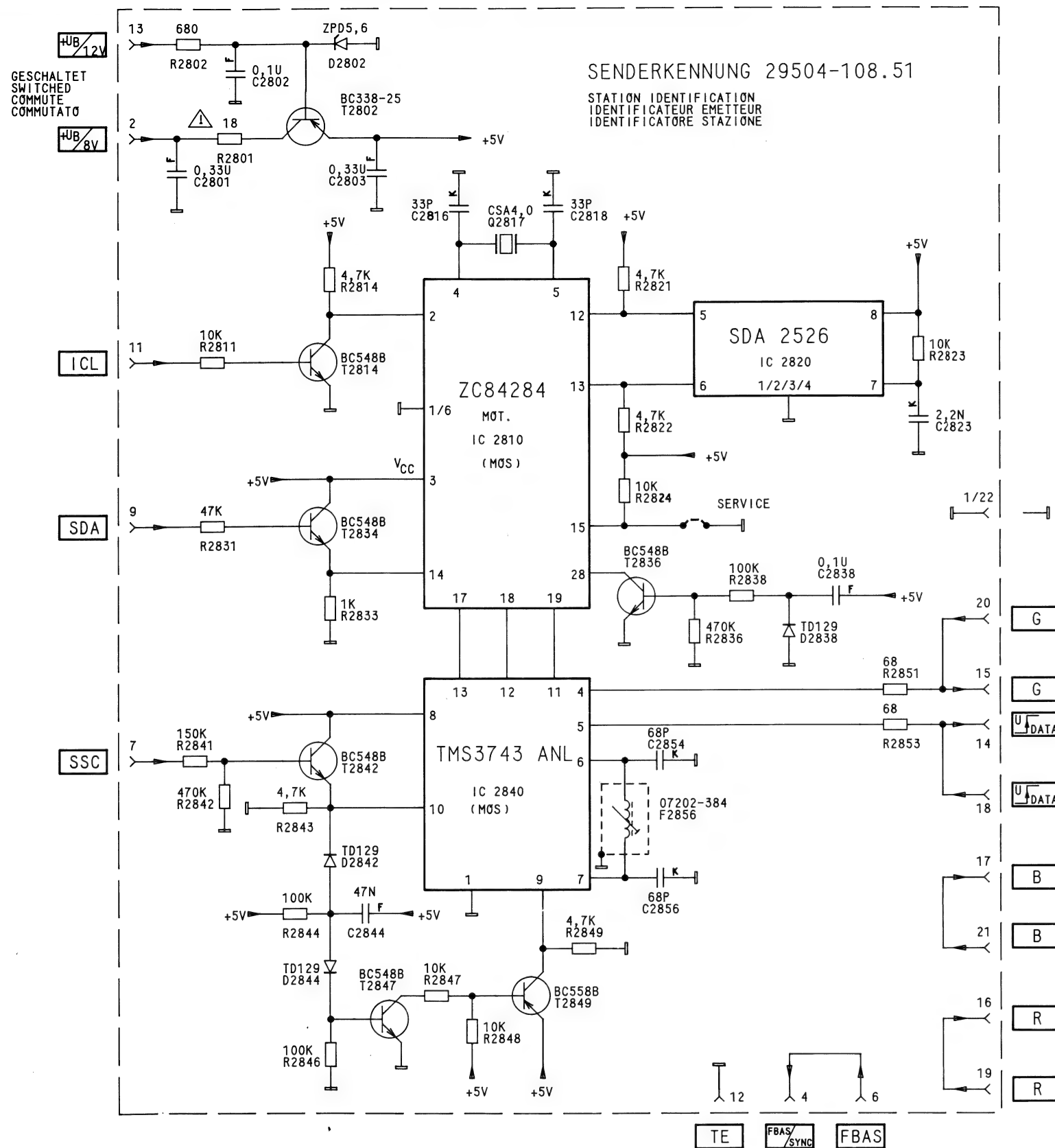
Montaggio e taratura d'addattamento della scheda ad innesto

Nel montare la scheda televideo togliere la piastrina televideo

Il regolatore R 2857 viene fornito col cursore girato completamente all'estrema sinistra (minima esaltazione delle alte frequenze, ca. 2 dB). Se si manifestano errori di carattere, nonostante un perfetto segnale d'antenna, girare lentamente il cursore di R 2857 verso destra fino ad eliminare gli errori. Non girarlo oltre può riaumentare la presenza degli errori.

Durante la taratura è necessario selezionare ripetutamente la pagina 199, poiché solo così è possibile una nuova immissione della pagina ed una valutazione della soglia degli errori.





Kein Anpassungsabgleich bei Austausch der Steckkarte notwendig
When replacing the plug-in board, no alignment is necessary
Non è necessaria nessuna taratura di adattamento dopo la
sostituzione di una scheda ad innesto

1. Weißabgleich

- FuBK-Testbild einspeisen.
- ③ min., ④ nom., ⑤ max. einstellen.
- Regler VG und VB (Bildrohrplatte) so einstellen, daß keine Verfärbungen in den Grauwerten sichtbar sind.

2. Sperrpunktgleich

- Eine manuelle Einstellung ist nicht möglich, da die Steckkarte eine automatische Dunkelstromregelung besitzt. Kontrolle des Sperrpunkts (Oszilloskop erforderlich).
- FuBK-Testbild einspeisen.
- ③ min., ④ nom., ⑤ max. einstellen.
- Tastkopf an den Kollektoren der Transistoren T 736, T 756, T 776 anhängen (Bildrohrplatte). Die Schwarzwerte der drei Kathodensignale liegen bei ca. 140-150V.

3. Einstellungen im Farbkanal

- PAL-Testbild einspeisen.
- FK nom., H nom. K max. einstellen.
- IC-Pin 28 vom TDA 4555 mit +12V verbinden.
- IC-Pin 17 vom TDA 4555 mit Masse verbinden.
- Mit Trimmer C9516 die durchlaufenden Farbbalken zum Stehen bringen.
- Kurzschlußbrücken entfernen.
- Tastkopf an MP 12, mit Regler BP und Spule LZ die Doppelbilder des B-Signals zur Deckung bringen.
- SECAM-Testbild einspeisen.
- Tastkopf an Pin 1 vom TDA 4555 anschließen, mit Spule DR Nulllinie des (R-Y)-Signals auf Zeilenniveau bringen.
- Tastkopf an Pin 3 vom TDA 4555 anschließen, mit Spule DB Nulllinie des (B-Y)-Signals auf Zeilenniveau bringen.
- Spule F 2521 so einstellen, daß das (B-Y)-Signal keine Überschwinger hat.

4. Strahlstrom

- Der Regler "SSB" wird werkseitig auf Mittelwert eingestellt.
- Sollte bei vollem Kontrast und normal eingestellter Helligkeit in Spitzenweißfeldern des Sendertestbildes eine Defokussierung (starke Unschärfe bei weißen Schriftzeichen in Bildröhrenmitte) auftreten, so muß mit Regler "SSB" auf scharfe Schriftkonturen eingestellt werden (Reduzierung des Spitzenstrahlstromes).

1. White level adjustment

- Display colour bar test pattern.
- Set ③ to min., ④ to nom., ⑤ to max.
- Adjust presets VG and VB (CRT socket board) so that the picture does not show any colouration.

2. Adjustment of cut-off point

- Manual adjustment is not possible, as the circuit board employs an automatic dark current control circuit.
- To check cut-off point (oscilloscope required), proceed as follows:

- Display colour bar test pattern.
- Set ③ to min., ④ to nom., ⑤ to min.
- Connect test probe to collectors of T 736, T 756, T 776 (CRT socket board).
- The black levels of the three cathode signals should be 140-150V.

3. Adjustments in chroma channel

- Display PAL test pattern.
- Adjust colour level and brightness to nominal value, contrast to maximum.
- Connect pin 28 of IC TDA 4555 to +12V supply.
- Connect pin 17 to IC TDA 4555 to chassis.
- Adjust trimmer C9516 for stationary pattern in colour bars.
- Remove wire links.
- Connect test probe to test point MP 12. Bring the double image produced by the B-signal to coincidence by adjusting the preset BP and the coil LZ.

- Display SECAM test pattern.
- Connect test probe to pin 1 of IC TDA 4555.
- Use coil DR to align zero level of the (R-Y) signal with the line black level.
- Connect test probe to pin 3 of IC TDA 4555.
- Use coil DB to align zero level of the (B-Y) signal with the line black level.
- Adjust coil F2521 so that the (B-Y) signal is free of overshooting.

4. Beam current

- During manufacture the control "SSB" is adjusted to middle value.
- If during max. contrast and normal brightness adjustment the peak-white fields of the test picture should be defocused (in the middle of the screen white letters are very distorted) the contours of the letters must be adjusted using control "SSB" (reducing the peak beam current).

1. Taratura del bianco

- Applicare un monoscopio FuBK.
- Regolare ③ al minimo, ④ sul valore nominale e ⑤ al massimo.
- Con i regolatori VG e VB (piastra cinescopio) eliminare eventuali macchie di colore.

2. Taratura del punto di blocco

- Una regolazione manuale non è possibile, poiché questa scheda incorpora una regolazione automatica della corrente d'interdizione.
- Controllo del punto di blocco (è necessario un oscilloscopio):
- Applicare un monoscopio FuBK.
- Regolare ③ al minimo, ④ sul valore nominale e ⑤ al minimo.
- Collegare la sonda ai collettori dei transistori T 736, T 756, T 776 (piastra cinescopio).
- Valore nero dei tre segnali catodici ca. 140-150V.

3. Regolazione del canale colore

- Applicare un monoscopio PAL.
- Regolare FK e H sul valore nominale, K al massimo.
- Sull'integrato TDA 4555 collegare pin 28 a +12V.
- Sull'integrato TDA 4555 collegare pin 17 a massa.
- Con C9516 fermare le barre colorate scorrevoli.
- Togliere i cortocircuiti.
- Collegare la sonda a MP 12, con il regolatore BP e la bobina LZ portare a copertura le immagini doppie del segnale B.
- Applicare un monoscopio SECAM.
- Collegare la sonda al pin 1 dell'integrato TDA 4555, con la bobina DR portare la linea zero del segnale (R-Y) sul livello della frequenza di riga.
- Collegare la sonda al pin 3 dell'integrato TDA 4555, con la bobina DB portare la linea zero del segnale (B-Y) sul livello della frequenza di riga.
- La bobina F2581 applicarla così in modo che il segnale (B-Y) sia chiaro.

4. Corrente catodica

- Il regolatore "SSB" viene regolato già in fabbrica su valori medi.
- Se con il contrasto al massimo ed una regolazione normale della luminosità dovesse presentarsi una sfocalizzazione nei campi ultrabianchi del cinescopio (le lettere bianche al centro del cinescopio risultano molto sfuocate), agire sul regolatore "SSB" per mettere a fuoco i contorni delle lettere (riducendo la corrente catodica di picco).

display SECAM test pattern.
 Connect test probe to pin 1 of IC TDA 4555.
 Use coil DR to align zero level of the (R-Y) signal with the black level.
 Connect test probe to pin 3 of IC TDA 4555.
 Use coil DB to align zero level of the (B-Y) signal with the black level.
 Adjust coil F2521 so that the (B-Y) signal is free of over-modulation.

current
 During manufacture the control "SSB" is adjusted to middle value.

During max. contrast and normal brightness adjustment the peak-white fields of the test picture should be de-focused (in the middle of the screen white letters are very distorted) the contours of the letters must be adjusted using control "SSB" (reducing the peak beam current).

Regolazione del bianco

Applicare un monoscopio FuBK.
 Regolare al minimo, sul valore nominale e al massimo.
 Con i regolatori VG e VB (piastra cinescopio) eliminare eventuali macchie di colore.

Regolazione del punto di blocco

La regolazione manuale non è possibile, poiché questa è incorporata in una regolazione automatica della corrente di deflessione.

Per il punto di blocco (è necessario un oscilloscopio):
 Applicare un monoscopio FuBK.

Regolare al minimo, sul valore nominale e al massimo.

Allegare la sonda ai collettori dei transistori T 736, T 756, T 756, T 6 (piastra cinescopio).

Il valore nero dei tre segnali catodici ca. 140-150V.

Regolazione del canale colore

Applicare un monoscopio PAL.
 Regolare FK e H sul valore nominale, K al massimo.

Il TDA 4555 collegare pin 28 a +12V.

Il TDA 4555 collegare pin 17 a massa.

Con C9516 fermare le barre colorate scorrevoli.

Eliminare i cortocircuiti.

Allegare la sonda a MP 12, con il regolatore BP e la bobina portare a copertura le immagini doppie del segnale B.

Applicare un monoscopio SECAM.

Allegare la sonda al pin 1 dell'integrato TDA 4555, in la bobina DR portare la linea zero del segnale (R-Y) sul livello della frequenza di riga.

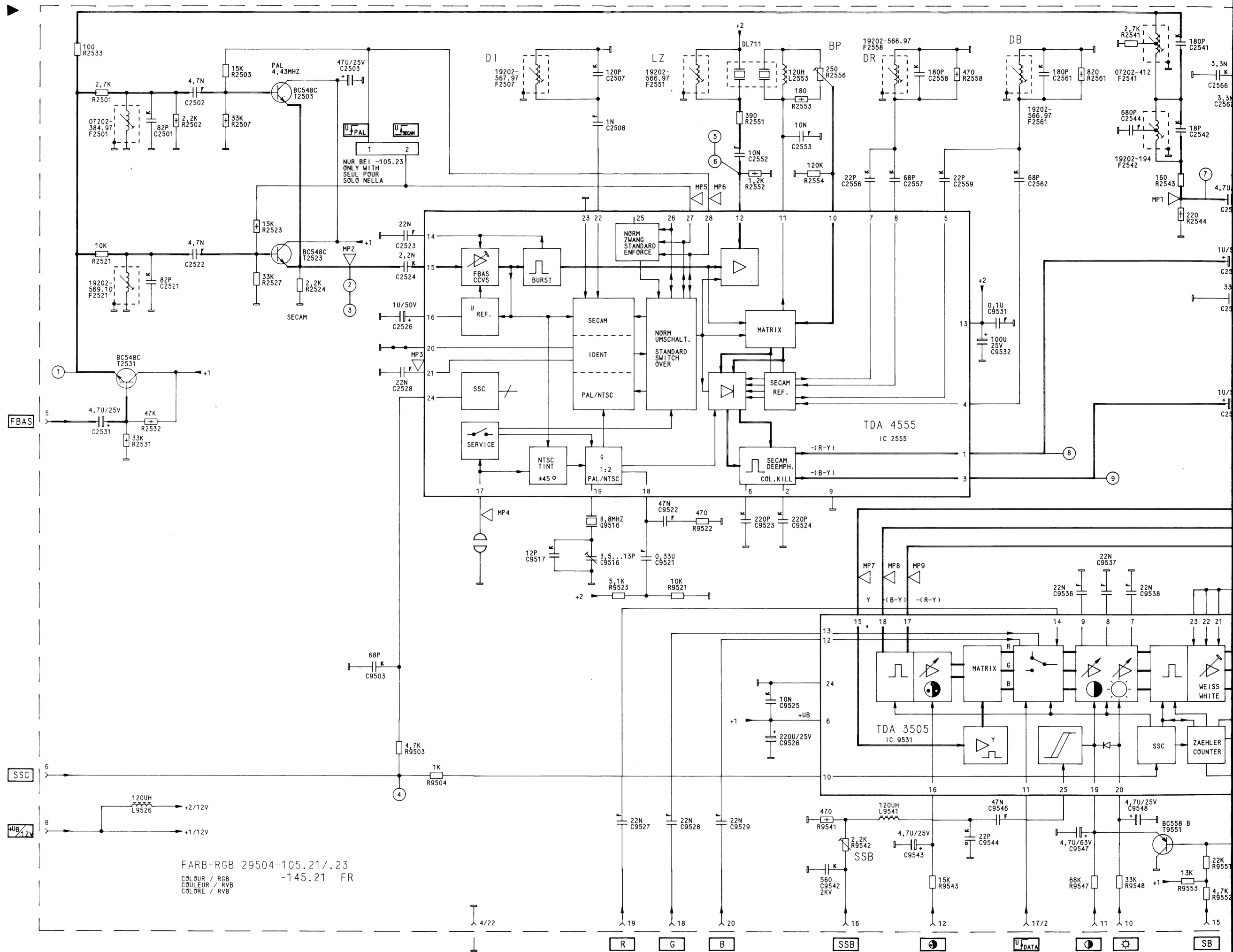
Allegare la sonda al pin 3 dell'integrato TDA 4555, in la bobina DB portare la linea zero del segnale (B-Y) sul livello della frequenza di riga.

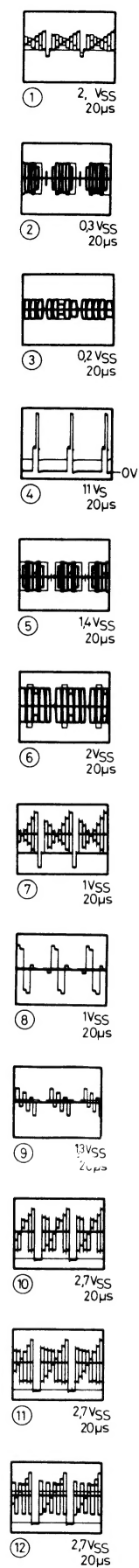
La bobina F2581 applicarla così in modo che il segnale (B-Y) sia chiaro.

Regolazione catodica

Il regolatore "SSB" viene regolato già in fabbrica su valori di riferimento.

Con il contrasto al massimo ed una regolazione normale della luminosità dovesse presentarsi una sfociazione in campi ultrabianchi del cinescopio (le lettere bianche al centro del cinescopio risultano molto sfuocate), agire sul regolatore "SSB" per mettere a fuoco i contorni delle lettere (riducendo la corrente catodica di picco).






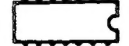



R
G
B
+12V
SW

Ersatzteilliste (Auszug) · List of Spare-Parts (extract) · Lista ricambi (estratto)

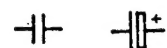
Pos. No.	Fig. No.	Bestell-Nr. Part No./Ref. Nr. d'ordinazioni	Benennung	Description	Désignation	Denominazione
<div>Steckkarten</div> <div>Plug-in circuit boards</div> <div>Schede</div>						
1		29504-101.01	Kabeltuner	Cable tuner	Tuner per tv cavo	
2		29504-102.64	ZF-Verstärker	Amplifier IF	Amplificatore FI	
oder						
2		29504-102.65	ZF-Verstärker	Amplifier IF	Amplificatore FI	
2		29504-102.66	ZF-Mono-2 Ton (20/21)	ZF-Mono	ZF-Mono	
2		29504-142.65	ZF-Verstärker (FR)	Amplifier IF	Amplificatore FI	
5		29504-105.21	Farb/RGB (CTI)	RGB/colour (CTI)	RGB/colore (CTI)	
5		29504-175.01	Farb-RGB (Spanien)	RGB/colour (Spain)	RGB/colore (SP.)	
5		29504-145.21	Farb-RGB (FR)	RGB/colour (FR)	RGB/colore (FR)	
8		29504-108.04	Videotext 2805	Videotext 2805	Televideo 2805	
8		29504-108.92	Videotext VT	Videotext VT	Televideo VT	
9		29504-108.51	Senderkennplatte	Plate	Piastra	
<div>Bedienungseinheit</div> <div>Keyboard unit</div> <div>Inita comandi</div>						
		(29501-061.01)	(29501-061.01)	(29501-061.01)	(29501-061.01)	
10		29624-415.01	Frontpl. m. Tasten	Front panel w. button	Piastra front..con tasti	
11		29303-452.01	Netzsteckerplatte	Plate mains switch	Piastra interruttore di rete	
12		29303-506.18	Snapfolie	Elastic foil	Foglia elastica	
13		29503-925.41	Keyboardplatte	Keyboard PCB	Piastra tastiera	
14		29304-013.17	LED-Platte kpl.	Plate LED cpl.	Piastra LED cpl.	
14		29304-017.01	LED-Platte kpl.	Plate LED cpl.	Piastra LED cpl.	
			(Mono/Ton 1/2 Anz.)	(Mono/Sound)	(Mono/Audio)	
<div>Mechanische Teile</div> <div>Mechanical parts</div> <div>Parti meccaniche</div>						
15		29304-070.54	Bildrohrplatte kpl.	Picture tube plate	Piastra cinescopio	
15		29304-070.37	Bildrohrplatte kpl.	Picture tube plate cpl	Piastra cinescopio cpl.	
15.1		29303-752.96	Bildrohrfassung	Picture tube socket	Zoccolo cinescopio	
16		29700-320.01	Bausteinhalter (CTI)	Module holderplate cpl.	Supporto modulare	
16		29700-315.01	Bausteinhalter	Module holder plate cpl	Supporto modulare	
17		29303-153.01	Montageclip	Mounting clip	Clip di montaggio	
18		29703-291.02	Netzschalter	Mains switch	Interruttore di rete	
19		29303-153.12	3x Montageclip	Mounting clip	Clip di montaggio	
20		09621-113.02	4x Sicherungshalter	Fuse holder	Portafusibile	
21		29303-393.01	Kopfhörerbuchse	EAR phone socket	Presa cuffia	
22		29303-119.03	Euro-AV-Buchse	Euro-AV-socket	Presa euro/scart	
23		29500-503.05	Abdeckung (AV)	Cover (AV)	Copertura (AV)	
24		29303-153.02	Montageclip	Mounting clip	Clip di montaggio	
25		29303-156.01	Isolierscheibe	Insulating washer	Rondella isolante	
26		8104-982-014	Dämpfungssperle	Anti-vibration	Perlina ammortizzatrice	
30		29303-364.01	Tuner Aufnahme	Tuner holder	Supporto tuner	
<div>Elektrische Teile</div> <div>Electrical parts</div> <div>Parti elettriche</div>						
K 501		8324-800-044	Kaskade	Cascade	Moltiplicatore in cascade	
		BG 2087-642-1010	BG 2087-642-1010	BG 2087-642-1010	BG 2087-642-1010	
		72003-090.02	Fokusregler (!)	Focusing control (!)	Regolatore del fuoco (!)	

CUC 3410 29701-047.01/02/03/04/05/06/07/08/09/10/11/20/21

Pos. No.	Fig. No.	Bestell-Nr. Part No./Ref. Nr. d'ordinazioni	Benennung Description Désignation Denominazione	Pos. No.	Fig. No.	Bestell-Nr. Part No./Ref. Nr. d'ordinazioni	Benennung Description Désignation Denominazione
<div>TR 665</div> <div>29201-022.04</div> <div>  </div> <div>F 808</div> <div>8602-331-085</div> <div>4,0 MG</div>				<div>T 746</div> <div>8303-406-421</div> <div>BF 421</div> <div>T 756</div> <div>8302-411-759</div> <div>GF 759</div> <div>T 762</div> <div>8303-401-422</div> <div>BF 422</div> <div>T 766</div> <div>8303-406-421</div> <div>BF 421</div> <div>T 776</div> <div>8302-411-759</div> <div>GF 759</div> <div>T 782</div> <div>8303-401-422</div> <div>BF 422</div> <div>T 786</div> <div>8303-406-421</div> <div>BF 421</div> <div>T 801</div> <div>8303-207-548</div> <div>BC 548</div> <div>T 806</div> <div>8302-202-538</div> <div>BC 548</div> <div>T 859</div> <div>8303-201-548</div> <div>BC 548</div> <div>T 861</div> <div>8303-200-548</div> <div>BC 548</div> <div>T 882</div> <div>8303-201-548</div> <div>BC 548</div> <div>T 1204</div> <div>8303-204-549</div> <div>BC 549 B</div>			
<div>  </div> <div>L 336</div> <div>8140-526-451</div> <div>L 337</div> <div>8140-526-451</div> <div>L 513</div> <div>29203-110.97</div> <div>L 514</div> <div>09245-804.21</div> <div>L 517</div> <div>09240-110.21</div> <div>2,2 MH</div> <div>L 519</div> <div>09245-882.21</div> <div>L 521</div> <div>09278-308.01</div> <div>L 601</div> <div>29500-812.97</div> <div>L 660</div> <div>09278-308.01</div> <div>L 661</div> <div>09278-314.01</div> <div>L 676</div> <div>8140-525-974</div> <div>L 806</div> <div>8140-526-327</div> <div>L 1213</div> <div>07202-370.97</div>				<div>  </div> <div>D 331</div> <div>8309-720-056</div> <div>ZPD 5,6</div> <div>D 333</div> <div>8309-201-103</div> <div>BA 157</div> <div>D 354</div> <div>8309-214-010</div> <div>TD 129</div> <div>D 355</div> <div>8309-720-082</div> <div>ZPD 8,2</div> <div>D 411</div> <div>8309-210-138</div> <div>1 N 4936</div> <div>D 421</div> <div>8309-210-401</div> <div>1 N 4934</div> <div>D 422</div> <div>8309-214-007</div> <div>TD 041</div> <div>D 512</div> <div>8309-201-103</div> <div>BA 157</div> <div>D 513</div> <div>8309-201-103</div> <div>BA 157</div> <div>D 514</div> <div>8309-204-268</div> <div>BYV 16</div> <div>D 517</div> <div>8309-709-180</div> <div>ZY 180</div> <div>D 518</div> <div>8309-210-144</div> <div>SKE 4 G/ 2</div> <div>D 519</div> <div>8309-204-228</div> <div>BY 228</div> <div>D 521</div> <div>8309-701-504</div> <div>BZX 85</div> <div>D 522</div> <div>8309-214-010</div> <div>TD 129</div> <div>D 528</div> <div>8309-201-103</div> <div>BA 157</div> <div>D 541</div> <div>8309-215-020</div> <div>1 N 4004</div> <div>D 543</div> <div>8309-215-020</div> <div>1 N 4004</div> <div>D 551</div> <div>8309-214-007</div> <div>TD 041</div> <div>D 552</div> <div>8309-214-007</div> <div>TD 041</div> <div>D 553</div> <div>8309-720-360</div> <div>ZD 36</div> <div>D 554</div> <div>8309-215-045</div> <div>1 N 4148</div> <div>D 562</div> <div>8309-707-035</div> <div>ZPD 30</div> <div>D 573</div> <div>8309-201-033</div> <div>BA 157</div> <div>D 621</div> <div>8308-560-384</div> <div>SKB 380/C 1600 L 5 B</div> <div>D 633</div> <div>8309-201-005</div> <div>BA 157</div> <div>D 635</div> <div>8309-198-586</div> <div>BAT 86</div> <div>D 647</div> <div>8309-201-103</div> <div>BA 157</div> <div>D 662</div> <div>8309-720-040</div> <div>ZD 3,9 C/O, W</div> <div>D 663</div> <div>8309-201-101</div> <div>BA 159</div> <div>D 664</div> <div>8309-201-101</div> <div>BA 159</div> <div>D 666</div> <div>8309-204-268</div> <div>BYV 16 TFK</div> <div>D 671</div> <div>8309-517-073</div> <div>BYW 72</div> <div>D 676</div> <div>8309-722-360</div> <div>MZ 2360</div> <div>D 677</div> <div>8309-215-006</div> <div>1 N 4001</div> <div>D 682</div> <div>8309-517-099</div> <div>BYW 98</div> <div>D 683</div> <div>8309-720-112</div> <div>ZPD 12</div> <div>D 684</div> <div>8309-201-103</div> <div>BA 157</div> <div>D 685</div> <div>8309-201-005</div> <div>BA 157</div> <div>D 691</div> <div>8309-517-099</div> <div>BYW 98-100</div> <div>D 708</div> <div>8309-707-012</div> <div>ZPD 4,7</div>			
<div>  </div> <div>IC 365</div> <div>8305-302-241</div> <div>TDA 1905</div> <div>IC 411</div> <div>8305-338-170</div> <div>TDA 8170</div> <div>IC 526</div> <div>8305-338-140</div> <div>TDA 8140</div> <div>IC 555</div> <div>8305-338-145</div> <div>TDA 8145</div> <div>IC 576</div> <div>29502-427.54</div> <div>IC 655</div> <div>8305-353-640</div> <div>TDA 3640</div> <div>IC 676</div> <div>8305-205-765</div> <div>7812/3 %</div> <div>IC 686</div> <div>8305-205-701</div> <div>78 M 05</div> <div>IC 696</div> <div>8305-007-808</div> <div>7808/5 %</div> <div>IC 811</div> <div>8305-158-018</div> <div>SDA 2010 A 025</div> <div>IC 811</div> <div>8305-205-676</div> <div>MC 6805 T 2</div> <div>IC 820</div> <div>8305-205-910</div> <div>MC 144111 (MOS) (!)</div> <div>IC 881</div> <div>8305-202-242</div> <div>UAA 2022 (MOS) (!)</div> <div>IC 1211</div> <div>8305-334-052</div> <div>TDA 4052</div>				<div>  </div> <div>T 111</div> <div>8303-205-548</div> <div>BC 548 B</div> <div>T 363</div> <div>8302-200-548</div> <div>BC 548 C</div> <div>T 521</div> <div>8302-260-905</div> <div>BU 903/2 SD 1432</div> <div>T 661</div> <div>8302-262-056</div> <div>BUT 56 A</div> <div>T 661</div> <div>8302-263-344</div> <div>F 344</div> <div>T 683</div> <div>8303-284-635</div> <div>BC 635</div> <div>T 736</div> <div>8302-411-759</div> <div>GF 759</div> <div>T 737</div> <div>8303-206-558</div> <div>BC 558 C</div> <div>T 742</div> <div>8303-401-422</div> <div>BF 422</div>			

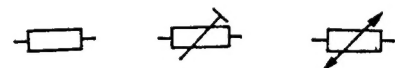
Pos. No.	Fig. No.	Bestell-Nr. Part No.	Benennung Description Désignation Denominazione
		Réf. Nr. d'ordinazioni	

D 737		8309-215-045	1 N 4148
D 741		8309-215-045	1 N 4148
D 743		8309-215-045	1 N 4148
D 746		8309-214-030	TD 190
D 761		8309-215-045	1 N 4148
D 763		8309-215-045	1 N 4148
D 766		8309-214-030	TD 190
D 781		8309-215-045	1 N 4148
D 783		8309-215-045	1 N 4148
D 786		8309-215-045	TD 190
D 804		8309-214-114	TD 129
D 807		8309-198-041	BAT 41
D 848		8309-214-114	TD 129
D 850		8309-214-010	TD 129
D 856		8309-214-010	TD 129
D 861		8309-214-010	TD 129
D 873		8309-214-010	TD 129
D 883		8309-214-114	TD 129
D 1201		8309-211-705	SFH 205 G



C 366		8415-166-150	2200uF/25 V
C 378		8555-262-181	0,22 uF (!)
C 380		8452-996-147	1000 uF/25 V
C 411		8452-996-274	2200 uF/50 V
C 414		8415-166-270	1000 uF/50 V
C 433		8415-166-191	2200 uF/35 V
C 462		8563-731-424	0,33 uF/160 V
C 501		8563-731-612	0,01 uF/1500 V (!)
C 510		8660-097-219	220 pF (!)
C 511		8515-911-002	560 pF/1600 V (!)
C 512		8525-033-487	8200 pF/400 V (!)
C 513		8525-040-433	1,2 uF/100 V (!)
C 513		8525-040-435	1 uF/100 V
C 514		8650-090-477	270 pF/2 KV (C/D)
C 517		8563-731-843	2,0 uF/250 V
C 518		8515-721-237	0,33 uF/250 V
C 519		8515-911-415	0,0155 uF/1600 V
C 520		8515-911-433	0,033 uF/400 V (!)
C 601		8599-990-025	0,15 uF/250 V (!)
C 609		8563-732-425	0,1 uF/250 V (!)
C 611		8660-097-234	1000 pF (!)
C 613		8660-097-234	1000 pF (!)
C 621		8650-090-510	1000 pF/1 KV
C 622		8650-090-510	1000 pF/1 KV
C 623		8650-090-510	1000 pF/1 KV
C 624		8650-090-510	1000 pF/1 KV
C 626		8443-306-055	220 uF/385 V (!)
C 653		8525-003-941	4700 pF/63 V (!)
C 664		8515-911-051	1000 pF/1200 V (!)
C 667		8442-900-010	2,2 uF/450 V
C 671		8650-090-510	1000 pF/1 KV
C 691		8531-689-357	0,022 uF/100 V
C 722		8563-731-655	0,15 uF/1000 V (!)

Pos. No.	Fig. No.	Bestell-Nr. Part No.	Benennung Description Désignation Denominazione
		Réf. Nr. d'ordinazioni	



R 333		8700-229-025	10 Ohm (!)
R 337		8705-269-299	12 Kohm
R 341		8700-252-017	4,7 Ohm (!)
R 341		8730-049-020	6,2 Ohm (!)
R 366		8700-007-409	2,2 Ohm
R 367		8700-229-017	4,7 Ohm NB (!)
R 378		8700-229-001	AX 0207-GA 1 Ohm NB (!)
R 411		8700-252-017	AX 0414/ 4,7 Ohm NB (!)
R 436		8790-047-109	100 Ohm
R 464		8773-347-040	2,2 Kohm
R 502		8700-007-521	100 Kohm
R 513		8700-249-071	820 Ohm (!)
R 514		8705-227-025	10 Ohm (C/D) (!)
R 517		8701-118-017	4,7 Ohm (!)
R 518		8705-227-239	39 Ohm
R 521		8705-369-229	15 Ohm
R 523		8730-018-977	1 W/0,1 Ohm
R 536		8765-044-123	120 Kohm (!)
R 536		8700-227-135	390 Kohm (!)
R 537		8705-269-209	2,2 Ohm (!)
R 537		8705-227-196	0,68 Ohm (!)
R 543		8700-007-473	1 Kohm (!)
R 554		8790-047-135	1 Kohm
R 561		8790-047-164	100 Kohm
R 563		8700-229-009	AX 0207-GA 2,2 Ohm NB (!)
R 568		8700-007-449	100 Ohm
R 573		8705-227-067	560 Ohm
R 609		8311-200-010	DUO-PTC (!)
R 621		8730-179-009	2,2 Ohm (!)
R 623		8311-400-125	VDR VZA 275 (!)
R 624		8718-250-158	3,6 Mohm VDE (!)
R 627		8718-250-014	4,7 Mohm VDE
R 637		8796-101-135	1 Kohm
R 641		8705-369-521	100 Kohm
R 647		8700-221-029	15 Ohm (!)
R 647		8700-007-429	8,2 Ohm (!)
R 663		8730-019-156	1 W/0,47 Ohm
R 664		8730-049-275	1,2 Kohm
R 667		8705-279-115	56 Kohm
R 671		8735-003-022	0,22 Ohm NB (!)
R 681		8735-003-022	0,22 Ohm NB (!)
R 683		8700-229-025	10 Ohm
R 684		8700-007-463	390 Ohm
R 691		8700-011-245	68 Ohm (!)
R 704		8705-269-020	6,2 Ohm (!)
R 721		8700-051-073	100 Kohm (!)
R 724		8797-215-674	470 Kohm
R 726		8766-357-137	470 Kohm (!)
R 734		8705-329-113	47 Kohm
R 741		8705-369-103	18 Kohm
R 742		8700-201-069	680 Kohm (!)
R 751		8790-047-135	SK 10 1 Kohm
R 754		8705-329-113	47 Kohm
R 761		8705-369-103	18 Kohm
R 762		8700-201-069	680 Kohm (!)
R 771		8790-047-135	SK 10 1 Kohm

Pos. No.	Fig. No.	Bestell-Nr. Part No.	Benennung Description Désignation Denominazione
		Réf. Nr. d'ordinazioni	

R 774		8705-329-113	47 Kohm
R 781		8705-369-103	18 Kohm
R 782		8700-201-069	680 Kohm (!)
R 801		8766-357-169	10 Mohm
R 802		8766-357-169	10 Mohm



Si 601		8315-617-006	2,5 A/T (!)
Si 624		8315-616-003	800 mA/T (!)

Bauteilhinweis

(!) Hinweis:

Bauelemente nach VDE-bzw. IEC-Richtlinien. Im Ersatzfall nur Teile mit gleicher Spezifikation verwenden!

Notes on components (!) Cautions

Components to VDE or IEC guidelines. Only use components with the same specification for replacement!

(!) nota:

Componenti secondo le norme VDE risp. te iec. in caso di

sostituzione impiegare solo componenti con le stesse caratteristiche!

Pos. No.	Fig. No.	Bestell-Nr. Part No.	Benennung Description Désignation Denominazione
		Réf. Nr. d'ordinazioni	

MOS = Vorschriften beachten
Observe MOS precautions
Attensione alle norme MOS

Serviceanleitung
Service manual
manuale di servizio

Änderungen vorbehalten · Alterations reserved · Tous droits de modifications réservés · Con riserva di modifiche